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***Europe/International
Economic Competitiveness***

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SCIENCE & TECHNOLOGY POLICY

EU: Commission Issues Report on Information Super Highway

94WS0373A Paris LE MONDE in French
2 Jun 94 p 24

[Article by European Union [EU] correspondent in Brussels, Philippe Lemaître: "According to Report by Martin Bangemann, European Commission Vice-President, Telecommunications Deregulation Would Provide Easier Access to 'Information Superhighways'"—first paragraph is LE MONDE introduction]

[Text] The information-based society, i.e., the use of digital transfer modes for the data (voice, image, text) that companies, government departments, and individuals use to communicate, cannot be developed in Europe without the complete and rapid deregulation recommended by the Bangemann report.

The extreme exchange flexibility made possible by the information-based society represents a considerable chance for the development of economic activity in Europe. Europe possesses the technology, the infrastructures (telephone, cable, satellite networks, etc.) and a potential market that is poised to grow. To remove the obstacles to an expansion that would promote employment, deregulation of the sector should be accelerated instead of waiting until 31 December 1998, the date chosen by the Twelve to eliminate telecommunication monopolies.

Such is the main thrust of the report about to be published by the working group chaired by Martin Bangemann, vice-president of the commission in charge of industrial affairs, and consisting of 17 chief executive officers [CEOs] and managers of companies belonging to that sector (users, equipment manufacturers, telecommunication operators); France was represented by Mr. de Carpentries, president of Bull, and Mr. Lescure, CEO of Canal Plus.

The "Bangemann group" was created at the invitation of the European Council (heads of state and government) of December 1993, in order to study, and propose operational extensions to the invitation made to the Twelve in the White Book of the Commission on Growth, Competitiveness, and Employment, to increase the integration of the EU's economy into the information-based society. It set up two sub-groups: one for technologies, chaired by Carlo De Benedetti, the Olivetti CEO; the other for regulations, headed by Etienne Davignon, president of Societe Generale de Belgique.

Europe is handicapped by the fact that the development of its market is slower than that of its competitors'. Poor economic conditions are not the main explanation. The slow growth of demand for new services is mostly due to excessively high rates due, according to the authors of the report, to the existence of monopolies. In order to launch a market that is ready to take off, the priority objective is to achieve a price reduction through increased competition. In the Netherlands and in Great-Britain, deregulation made it possible to do just that. "It has been demonstrated that deregulation will expand the market," a Commission high official commented.

The Example of Mobile Telephone Service

Deregulation, the manufacturers in the group believe, should not take place in stages, according to the traditional Community approach, but as thoroughly and as quickly as possible. Without giving dates (attempting to do so might trigger a futile debate), they explicitly declare themselves in favor of deregulating telecommunications before the end of 1998.

It will not be that easy. The authors of the report emphasize the need to adjust rates, lighten the constraints imposed on operators, and allocate between them (France-Telecom, Deutsche Telecom, Belgacom, to name just a few) and newcomers the responsibilities imposed by governments. "We are all in the same boat; everybody must contribute," one of them explained.

The authors of the report note that the deregulation they demand will not take place at the expense of existing structures: the protection that traditional operators enjoy is illusory; actually, they are losing market shares to the extent that, because of their monopolies, they cannot claim access to new services.

However, stepping up the dismantling of monopolies will not suffice to revive the demand. A critical mass is required to get progress under way, and it is therefore important to provide momentum. The report identifies the services for which demand may increase rapidly, given a modicum of incentives: health-care and university networks, government departments, as in the United States to manage procurement contracts, networks of small or intermediate-size companies, multimedia markets. Public investment could play its part, in particular to promote interconnections between member State networks. This mobilization should extend to towns and communities.

Manufacturers, however, point out that if the environment is favorable, the private sector will be able to provide most of the financing. But it needs a political cover, namely the States' green light to accelerate deregulation.

The information-based society is "global." Competition will come into play at planet level and, as Etienne Davignon put it, we should not be too "naive"; all markets must open up, and the European Union will open its market only to companies from countries where EU manufacturers are free to operate. Paris should rejoice: Europe is rediscovering the benefits of reciprocity!

France: GIFAS Chief on 1993 Results, 1994 Prospects

BR1204123094 Paris LE BULLETIN DU GIFAS
in English 10 Mar 94 pp 1-12

["Press conference by GIFAS President Serge Dassault on 1 March; place not given]

[Text] Chairmen, Ladies and Gentlemen, I am happy to be with you again today for our traditional GIFAS [French Aeronautics and Space Industries Group] meeting and I thank you for being here. This will be an opportunity for me and the leaders of our profession who are here with us today to make a general survey of the state of our industry and examine what the future holds in store.

The year 1993 presented a bleak picture for our civil and economic endeavor with no signs of an upturn in sight. The terms of France's new Military Plan should clarify the basic defense orientations decided on by our government. Our hope is that it will also confirm an end to what has been a long period of attrition for the airlines.

Let us examine the 1993 figures. Generally speaking, they continue to reflect the economic slump that started in 1991 and grew to new proportions in 1993 with repercussions in France and throughout the world. The backlash was felt in both the civil and military spheres:

- The airlines, which have been accumulating heavy losses since 1991 adopted restructurization policies which entailed the cancellation of deferral of aircraft orders. As a consequence, manufactures of large carriers all over the world received more cancellations than orders. Airbus did not escape.

ATR fared somewhat better with only 27 cancellations and went on to excellent results, booking 61 firm orders in spite of a very narrow market. Executive aircraft were also hit by the slump.

In the motor field, in spite of consolidating its market share, annual production of the CFM56 was cut back by nearly 40 percent compared to 1992, already a recessive year compared to 1991.

- In France, military production has been spread out for certain programs following the cancellation of many orders booked during the preceding years. Our military exports were below the 1992 mark.

- In addition, we have encountered highly aggressive American attitudes in all aspects of the civil and military markets. Nor must we overlook the Russians, who continue to develop civil and military prototypes and eagerly seek export outlets for them. Initial estimates indicate an overall non-consolidated 1993 revenue of 110 billion French francs [Fr] in our profession against 120 billion in 1992, a short fall of 8.5 percent in current francs.

Unlike 1992, when only motorists and equipment manufacturers saw their revenues shrinking, all three branches were faced by this problem in 1993. Expressed in current francs, the drop was:

- minus 7 percent for aircraft and missiles,
- minus 11 percent for motors,
- minus 10 percent for equipment.

In the three years from 1991 to 1993, our turnover contracted by 10 percent. If considering the growth partners over 10 years, it will be seen that we are now below the 1989 level of Fr122.6 billion in terms of 1993 constant francs.

Let us consider the major characteristics of our activities in 1993:

- In spite of a downward trend in civil revenue (nearly 6 percent drop in current francs), civil activities account for 55 percent of total turnover.

- Revenue for military production shrank by 11.3 percent in value. This was essentially due to reduced foreign sales.

- Revenue for civil exports experienced a slight dip of 3 percent, slightly less than in 1992. This is mainly because nearly half the Airbuses delivered in 1993 were jumbo carriers which are more expensive than medium-range liners.

Let us now consider the order books. Orders booked in 1993 represented an overall total of Fr88 billion against 110 billion in 1992, a drop of 20 percent. These orders are characterized by:

- Increased cut-back (nearly 35 percent) in export orders, compared with a 4.4 percent cut-back in domestic French orders.

- A reduction in military orders (24.6 percent).

- In 1993, as in 1992, the proportion of military orders remained preponderant at 59 percent of total orders. The figure is 50 percent for export orders.

- Finally, if examining bookings per branch of the profession in 1993, it will be seen that equipment orders grew 17 percent in value, essentially due to military exports directly traceable to the Taiwan order of 1993.

At a nearly Fr36.5 billion, export orders were below the 1991 level of 41 billion. Consequently, the gear-down in activities that started two years ago was more significant in 1993.

Our enterprises are now confronted with the serious problem of adapting manpower to work loads. This has meant job losses and has interrupted our pattern of recruiting, especially young engineers. Our work force, estimated at 105,300 persons as of 31 December 1993 had contracted by nearly 6 percent in 1993, with more than 6,000 jobs lost. In the three years from 1991 to 1993, employment declined by around 15,400 jobs from the total 121,000 recorded on 1 January 1991 (a loss of 13 percent). This does not include temporary measures (partial unemployment, long duration layoffs, all temporary stopgaps to maintain jobs). Our work force of tomorrow will depend upon the new Five Year Plan and the health of airlines. Civil transportation markets seem to be showing new signs of recovery with a rise of nearly 6 percent anticipated for 1994. But the financial status of the airlines is still precarious.

In spite of a difficult situation, our industry remains the foremost of its kind in Europe, with 35 percent of European production, and second in the Western World (with 9 percent of world production).

High quality products, leadership in the field of cooperation and a significant contribution to the balancing of the French trade balance (one of the professions that makes the largest contribution), and the highly qualified jobs that it generates has made our industry a proud leader of French high tech industries. Just as President Clinton has recently thrown his full weight into promoting the American aeronautical industry, it would only be logical for European governments to do the same. Regardless of problems, we continue to invest a whopping 30 percent of our budget in research and development.

It is on the strength of these efforts that we are able today to propose an excellent line of highly competitive products within a highly competitive civil and military market. This is not an easy undertaking as shown by the difficulty of bringing out new fighter aircraft programs in Europe, Sweden and even in the United States. The aeronautical and space industry is simultaneously a key element in the defense of our Country. It spurs on the development of advanced technologies with spinoff civil applications and is an important factor in economic development. Our entire economy in the 21st century should be based on technologies of this kind. The aeronautical and space industry should be considered a double action strategic industry. To conform to this conception, our government would have to decide:

1. To increase research and development credits for both the French defense and civil aviation budgets, which is not yet the case.
2. To increase the terms of the 1995/1996/1997 military budget sufficiently to enable us to maintain all our programs and expertise.
3. To lend its full political and financial weight systematically wherever necessary to encourage the export of our civil and military products.

These are, we believe, the major lines that must be followed to maintain a strong and competitive aeronautical industry in France and to make our country a high-tech power ready and eager to face the year 2000 and the competition that will only increase, not only in Europe, but also in Asia.

Thank you for your attention.

Report And Statistics 1993

Estimates on benchmark figures concerning the French aeronautical and space industry in 1993.

I. The General Situation

1. The World Economy

With a growth just over 1 percent, the economic expansion of the major industrial OECD member countries was subdued in 1993 and below the level of 1992 (1.8 percent). These results are due to a significant contraction of activities in European countries and Japan, which has upset the balance with English-speaking nations (United States, Canada, United Kingdom), where, on the contrary, the first signs of a moderate recovery are being discerned. European unemployment at approximately 10.7 percent and rising, is far above that of the United States (approximately 6.4 percent) or Japan (2.5 percent).

In spite of the monetary crisis of the European serpent which led to monetary fluctuations during the summer of 1993, European countries, by lowering interests rates have elected to continue a policy of elastic currency movements. Furthermore, with their growing deficits, governments have tended to maintain restrictive budgetary policies. The recent hardening of American policy and the resultant appreciation of the dollar should make European products more competitive on international markets and favor a swing back to a more vigorous economic situation.

2. Factors Typical of the Aerospace Industry

—Military activities

While we are experiencing a period of stringent public financing and a tightening of defense budgets by the leading countries (United States, Germany, United Kingdom), the defense budget of France for 1994 (excluding pensions) is not only maintained, but 3.6 percent higher than in 1993. At Fr103 billion (94.9 billion in available credits, 5.5 billion left over and 2.6 billion in transferred credits), the budget for military equipment (Chapter V) indicates a growth of 5.7 percent over credits effectively allotted in 1993 (Fr97.5 billion). Although the funds granted under Chapter V guarantee the continuation of current programs, they comprise a six-month delay with regard to the Rafale fighter aircraft (Air and Navy versions) and for the aircraft carrier Charles de Gaulle.

From \$40 billion in 1988 exports had dropped to \$18 billion by 1992, a loss of over 54 percent, while the volume of armament trade throughout the world has regularly followed the deceleration started in 1988.

—Civil activities

In the civil branch, one of the key events in 1993 was continuation and completion of GATT negotiations. The participating countries, particularly the United States and Europe, were not able to reach an agreement in aeronautical matters. The bone of contention essentially concerned the kind and the extent of state support given to aeronautical industries as defined by the bilateral EU-USA agreement of July 1992 covering heavy carriers.

The Americans and Europeans were not able to reach an agreement and voted a moratorium of one year in which to define specific aeronautical guidelines, including jumbo carriers, aircraft seating fewer than 100 passengers, engines and equipment. Discussions are still going on in accordance with the proposals of Mr. Lindstroem, Chairman of the Aircraft Code. While the new negotiations are in progress, the bilateral agreement of July 1992 remains in force. If negotiations were to fail, aeronautical matters could be included under the heading of the General Government Aid Code. This would be far more detrimental to European than to American industry. One solution for the European side might be to adopt a system of indirect support instead of the reimbursable advance payment concept.

II. Data

1. Total Revenue

The contraction in aeronautical and space activities started in 1992 gained momentum in 1993. Initial estimates for the fiscal year 1993 presage a drop of 8.5 percent in value (in current francs) for non-consolidated turnover, or Fr110 billion (compared to a drop of 0.4 percent in 1992).

Unlike 1992, all three branches saw an erosion in their total revenues in 1993 (domestic plus export): 7.1 percent in value for aircraft manufacturers, 10.4 percent for engine manufacturers and 9.9 percent for equipment manufacturers. The aircraft manufacturers have seen turnover contract both for domestic and export sales. Turnover growth for domestic business noted by the motorists is not sufficient to offset the contraction of export business. The

picture is quite the opposite for equipment manufacturers whose exports are positive while domestic sales have contracted significantly.

The shrinking of military turnover that started two years ago was more dramatic in 1993, with a shortfall of 11.3 percent in value. This is essentially due to a drop in exports.

The trend for civil turnover to drop was confirmed in 1993 (minus 5.9 percent in value) and reflects the contraction of the French civil market.

2. Export Revenue

Export turnover fell 12.9 percent in value in 1993, even more dramatically than domestic revenue (4.5 percent). The drop in export sales reflects a shrinking of military exports: minus 32.6 percent in value compared to plus 20 percent in 1992. To be sure, 1992 was an exceptional year, notably because of the settling of certain disagreements with other countries and subsequent invoicing.

The equipment manufacturers posted a gain of 1.3 percent in current francs for export turnover in 1993 and seem to have resisted the recession of foreign markets better than the aircraft manufacturers (minus 10.6 percent in value) or the even harder hit motorists (minus 26.6 percent in value).

In the case of civil export revenue, the 1993 recession was less brutal (minus 3 percent in current francs) than 1992 (minus 5 percent).

3. Orders

At Fr88 billion, total orders contracted 20 percent in value compared to 1992. A comparison of domestic against export sales shows a considerable shortfall in export orders (minus 34.9 percent) while domestic orders fell by 4.4 percent. The poor showing of French aeronautical and space order books reflects a strong contraction in military orders (26.6 percent), and particularly in military export orders (46.9 percent in value). Accordingly, civil activities represented over 40 percent of the total picture (against 38 percent in 1992) while the military share fell to 59 percent (against 62 percent in 1992). It must be remembered that the '92 figures include the order for 60 Mirage 2000-5s from Taiwan. Comparison shows that total orders booked in 1993 represented 4.6 percent less in value than those booked in 1991.

The three branches of the industry encountered different situations in their '93 orders. Only the equipment manufacturers showed a growth in total orders (plus 17 percent in value), especially through military export orders (plus 69.7 percent in value), ascribable to spinoff from the Taiwan order.

Both domestic and export orders contracted for the aircraft manufacturers. A growth in domestic orders (9.9 percent) for engine manufacturers was far from offsetting the drop in export orders (minus 38.4 percent).

Order books indicate a drop of 4 percent in value and represent two years of production, although actual execution is spread out over a far longer period.

4. Market Trends for Different Products

—Civil Activities

The airlines tried to cope with losses accumulated in 1992 by restructuring policies that affected fleets and personnel. For manufacturers, this meant cancelled or deferred orders. The total deficit of the airlines, which had reached an unprecedented 4.8 billion dollars in 1992, is accordingly expected to be around \$2.4 billion for 1993, slightly better.

This persisting grim situation in the carrier trade did not affect the two major European joint ventures Airbus and ATR in the same way. For the Franco-Italian venture ATR, 1993 was a very good year, with 138 orders in all, including 61 firm commitments (against 20 in 1992) and 77 options. In consequence, the consortium now has a backlog of 60 aircraft pending delivery (26 ATR 42s and 34 ATR 72s), which will make for a full year of production. ATR has now claimed 53 percent of the world market for turboprop aircraft carrying 40-70 passengers and has a clientele of around 60 airlines. With 47 new aircraft delivered (as against 51 in 1992), the consortium's revenue figure remained stable at Fr3.7 billion. Nevertheless, even ATR was not left unscathed by the slump dogging the world's airlines, as 27 orders booked in 1993 were cancelled.

Europe's Airbus consortium felt the full brunt of the airline restructuring policy, both on the commercial and production levels. Far fewer orders were booked than in 1992. The 38 firm orders received were far from the 136 booked in 1992. Cancellations (69), although fewer than in 1992 (95), exceeded orders.

Order books, on the downgrade at 667 aircraft, should still ensure four years of production. The delivery of 138 aircraft does not compare favorably with the 157 of 1992. Still, turnover is on the rise by 13.7 percent owing to the fact that nearly half the aircraft delivered were expensive Jumbo carriers (22 A340s, 1 A330, 44 A300/310s), as the A340 entered commercial service in 1993.

The year 1993 is expected to be less morose than 1992 for business aircraft. Dassault Aviation has claimed approximately 15 percent of the world market for executive aircraft, with 70 percent of sales made in the United States.

In the realm of helicopters, the Eurocopter group booked 166 orders for new helicopters in 1993, of which 95 percent are for export. The group has expanded its share of the world civil market with 54 percent in value (against 51.5 percent in 1992) in spite of a market that has dropped by 14 percent.

—Military Activities

Under the heading of military aircraft, 12 Mirage 2000Ds and 10 Mirage FICTs will be delivered in 1994, although only 3 Mirage DAs will be delivered instead of the initially planned 6. The French government has also ordered 3 Rafales for 1993.

While the Mirage 2000-5 program moves ahead on schedule, the Rafale (Navy and Air) has accumulated a six-month delay which entails additional costs for the firms involved. The Charles de Gaulle aircraft carrier, laboring under the same delay, should enter service around mid-1999 with 6 Rafales and will eventually carry a total of 35 to 40 aircraft. By 1 January 2000 it should carry a flotilla of 12 Rafales.

In the field of military helicopters, the two major programs, NH90 and Tigre, have been retained in the French defense budget of 1994. In spite of export contracts for the Cougar helicopter, 1993 is expected to show a contraction compared with 1992 for the Eurocopter group. The group has nevertheless increased its share of the world military market (not including the USA and CIS) to 24 percent compared to 7.5 percent in 1992.

5. Commercial Balance

It is not yet possible to give trade balance figures for the profession because figures are not yet available concerning imports made by the profession, and official figures concerning outside acquisitions by French aeronautical customers (government, airlines). It is anticipated, however, that trade balance figures will again place the industry in the front rank of those making a positive contribution to the trade balance of France. The positive commercial trade balance figure was Fr34.8 billion in 1992.

6. Employment

With the significant cutback in activities in the past two years, the profession has been confronted with the grave

problem of scaling work force to production loads. This need to adapt has meant the loss of many jobs and a near freeze on recruitment. Over 6,000 jobs were lost in 1993 and the total estimated work forces as of 31 December 1993 was 105,300 persons.

Social resolutions negotiated with the authorities and unions have made it possible to find new employment for many of those affected by restructuring. Other temporary measures increasingly adopted in 1993 (partial unemployment, unpaid reduced work hours, long duration layoffs, etc.) have made it possible, temporarily at least, to safeguard many jobs. For example, this part-time employment represented over 4 percent of full employment time, or the equivalent of around 4,600 jobs. These temporary measures will be continued and in some cases amplified in 1994. With increasing frequency, enterprises within the profession are showing great imagination and creativity in finding solutions to the problem.

7. The Outlook for 1994

Econometric analysis conducted by GIFAS on the basis of orders received during the past four years, indicate that a contraction of 2 percent may be anticipated in the non-consolidated revenue figure, in terms of value for the year 1994.

	1993		1992	
(Estimated)				
	REVENUE (in millions of current francs)			
	non-consolidated	consolidated	non-consolidated	consolidated
TOTAL	110,000	93,500	120,153	103,357
Metropolitan				
France	61,113	44,613—48 percent	64,016	47,219—46 percent
Export	48,887	48,887—52 percent	56,137	56,138—54 percent
Civil	60,023—55 percent		63,778—53 percent	
Military	49,977—45 percent		56,375—47 percent	
	ORDERS (in millions of current francs)			
TOTAL	88,000		110,005	
Metropolitan				
France	51,456		53,837	
Export	36,544		56,168	
Civil	36,378 (41 percent)		41,582 (38 percent)	
Military	51,622(59 percent)		68,423 (62 percent)	

Figures pertaining to the 1993 fiscal year are estimates based on a sampling of firms representing 97 percent of French aeronautical and space activities. These are only estimates. Final figures will be available in July 1994.

Non-Consolidated Aeronautical and Space Revenue				
	Total (Export + Domestic—in millions of current francs)			
	Aircraft and Missiles	Power Plants	Equipment	Total
1992	66,209	24,781	29,163	120,153
1993 Estimated	61,523	22,205	26,272	110,000
Variations (percentage) in value	-7.1 percent	-10.4 percent	-9.9 percent	-8.5 percent

Non-Consolidated Aeronautical and Space Revenue (Continued)

	Total (Export + Domestic—in millions of current francs)			
	Aircraft and Missiles	Power Plants	Equipment	Total
Export				
1992	34,348	13,935	7,854	56,137
1993 Estimated	30,698	10,230	7,959	48,887
Variations (percentage) in value	-10.6 percent	-26.6 percent	1.3 percent	-12.9 percent
Domestic				
	Aircraft and Missiles	Power Plants	Equipment	Total
1992	31,861	10,846	21,309	64,016
1993 Estimated	30,825	11,975	18,313	61,113
Variations (percentage) in value	-3.3 percent	10.4 percent	-14.1 percent	-4.5 percent

Source: GIFAS/Direction Statistiques-Econometrie-Budget/CG-FK/RL-EP

Aeronautical and Space Orders Booked

	Total (Export + Domestic—in millions of current francs)			
	Aircraft and Missiles	Power Plants	Equipment	Total
1992	68,458	17,098	24,449	110,005
1993 Estimated	44,563	14,819	28,618	88,000
Variations (percentage) in value	-34.9 percent	-13.3 percent	17.1 Percent	-20.0 percent
Export				
	Aircraft and Missiles	Power Plants	Equipment	Total
1992	39,897	8,232	8,039	56,168
1993 Estimated	21,565	5,071	9,908	36,544
Variations (percentage) in value	-45.9 percent	-38.4 percent	23.2 percent	-34.9 percent
Domestic				
	Aircraft and Missiles	Power Plants	Equipment	Total
1992	28,561	8,866	16,410	53,837
1993 Estimated	22,988	9,748	18,710	51,446
Variations (percentage) in value	-19.5 percent	9.9 percent	14.0 percent	-4.4 percent

Source: GIFAS/Direction Statistiques-Econometrie-Budget/CH/FK/RL-EP

Fluctuations in the Work Force of the Aeronautical and Space Industry per Branch

120,719	118,958	111,693	105,300	Total Employment
23.0 percent	22.7 percent	23.0 percent	23.3 percent	Power Plants
29.8 percent	29.3 percent	28.2 percent	27.7 percent	Equipment
47.2 percent	48.0 percent	28.8 percent	49.0 percent	Aircraft and Missiles
31-12-90	31-12-91	31-12-92	31-12-93	
Estimated				

Fluctuations in the Work Force of the Aeronautical and Space Industry per Branch

120,719	118,958	111,693	105,300	Total Employment
22.1 percent	23.0 percent	24.0 percent	25.0 percent	Engineers and Cadres
29.5 percent	28.5 percent	27.5 percent	26.0 percent	Workers
48.4 percent	48.5 percent	48.5 percent	49.0 percent	ETAM
31-12-90	31-12-91	31-12-92	31-12-93	

(estimation)

ETAM=Employees, Technicians, Draughtsmen, Supervisory personnel

French Research Debate Continues

BR2306135494 Paris *ENSEIGNEMENT SUPERIEUR ET RECHERCHE* in French May 94 pp 3-6

[Unattributed report: "Consultation on French Research: National Synthesis Debate"]

[Text] The synthesis debate was the last stage in the process of national consultation on the primary aims of French research. Over 1,000 participants attended the debate, held at the Paris Science and Industry Park on 15 April in the presence of [Prime Minister] Edouard Balladur and [Higher Education and Research Minister] Francois Fillon. In his speech, the prime minister paid homage to Mr. Fillon and all participants and organizers of the consultation, stating that the two main challenges that France had to face up to were the development of research—"in an increasingly competitive world"—and "the social challenge represented by the partitioning of our society and all the risks that that entails in terms of exclusion."

Chaired by Pierre Algrain, the debate aimed to present participants with a summary of the six colloquia held in recent months in the regions, plus a number of other contributions: the conclusions of the colloquia held at the CNRS [National Scientific Research Center], the INRA [National Agronomic Research Institute], the CEA [Atomic Energy Commission], and so forth, as well as over 400 oral and written contributions, some of which came from trade union organizations.

In his speech welcoming the prime minister, Francois Fillon recalled the importance of this process of consultation, a six-month period of discussion and reflection: "Since 1982, there have been no major debates on our research policy, nor on the results of science in France, nor on the main policy lines it is the government's duty to lay down for both the public research bodies and the universities. (...) However, since that time many things have changed in France, Europe, and the world, starting with society which no longer views science in the same way (...). A debate was necessary to inject fresh impetus into our research policy (...). At the end of today's meeting, I and my staff will set to work on drawing up a final policy guideline report (...) which will be submitted (...) to parliament before the end of the current session. One of the aims I will be pursuing in the initial conclusions to this report is ensuring that they are integrated into the budget for 1995."

A Summary of the Consultation Process

Guy Aubert, director of the Lyons Higher Education Training Institute, then summarized the consultation process. In his speech he noted the concerns of researchers which in many cases run through the divisions made by the first guideline report: "While on certain specific points of the analysis proposed by the guideline report there were some differences of opinion, notably surrounding social and human sciences, it is important to note that participants adhered to the general consensus. (...)"

"The French research tool is a complex system that can only be run according to a few simple guidelines which have yet to be discovered (...). It was highly recommended that the necessary balance be struck between planning large-scale resources and, in particular, major outfitting, the assigning of the accompanying facilities that ensure that they are used

effectively, and the constant support or measures of encouragement that are essential for the various laboratories to function correctly (...). This problem (...) will have to be taken into account in a global planning strategy that bears on all research activity in the country."

Managing Scientific Employment

"A number of issues were raised concerning the management of scientific employment. The structural duality of French public scientific research and the way in which its two types of components—large administrations and universities and institutes of higher education—interact are considered as both an original and enriching feature (...). The necessary functional coupling of higher education and research must be done in such a way that both sides benefit (...)."

"Many suggestions were made as to how to increase adaptability and flexibility where professional career evolution and change are concerned (...). The issue of permanent recruitment plays an extremely important role in such a system (...). The perspective of mass retirement—perfectly planned and predictable—relating to the necessarily long training period required for staff working at this level, means that there is a pressing need to set up a mechanism capable of dealing with this (...)."

"The consultation process has not resulted in the birth of a new, complex system responding to changes in the current situation, but it has shown that such a system should integrate (...): an initial mobility; a functional mobility throughout an individual's career, with all the appropriate mechanisms; and the management of employment by estimation over periods compatible with the time constants specific to the system. Moreover, a real recognition of the importance of administrative and technical staff implies more coherence of status and a more in-depth analysis of their roles by, for example, an observatory set up to examine these professions."

Geographical Spread

"In France, we cannot hope to have a large number of centers of excellence scattered evenly over the whole country (...) because of the extent of the human and material resources that would have to be implemented (...)."

"If there is to be an optimized establishment of research facilities throughout the country, we will need to find a compromise between the option that aims to bring higher education closer geographically to the source of the students, and the option that would guarantee student researchers the possibility of contributing to the national research effort by working in top level centers."

"The idea of a network organization has often been put forward, but its practical implementation is far from evident."

Public Technological Research, Industrial Research, and Business

"Innovation brings cross-disciplinary relations into play (...). The company must assemble a complex puzzle (...) that is not restricted merely to research and technology. In each case, cultures that differ in their working methods, timeframes, and languages must be made to work together. Much has been made of the role played by social, human,

legal, and economic sciences (...). These are essential to facilitate the penetration of technical change, new technology, and innovation into business and into society. They must help us understand, predict, and monitor changes on the social, economic, and geopolitical levels."

"The linear and reassuringly simple picture taking us from basic research to applied research and thence to development and production has now been swept aside and has been replaced by apprehension about the complexity of the process that augurs well for the effort that will have to be made, including: the simplifying revision of the system of interfaces between public research facilities and business, in particular small and medium-sized companies and industries (...); and a strengthening of the place of technology in higher education and research (engineering sciences), the ground being laid by the development of a spirit of creativity and the taste for techniques that must be reestablished throughout the education system."

The International Dimension of Research

"Here I will mention three sets of proposals bearing on our relations with three types of partner."

"With developing countries and the countries of central and East Europe we must: redefine our cooperation policy which will have to be conceived as an enterprise involving the whole of society, looking for support from public opinion; clearly determine our priorities, our partners, and our aims; and make a parallel assessment of our policy using the most suitable expert tools."

"With the European Union we must: better coordinate Community and national programs; arrive at a clear understanding of the concept of subsidiarity; make the procedures for the definition, adoption, and management of Community programs simpler, faster, and more transparent; ensure closer ties between the scientific communities and the technology involved in the establishment of French positions; and improve the dissemination of information."

"With the leading industrialized countries we must: take restrictive action with regard to certain lopsided cooperation agreements; establish dialogue in areas where we may be sufficiently advanced to benefit from the knowledge of our competitors; and ensure that research is more solidly anchored in the industrial fabric by increasing the share of research directly assigned to this domain."

Ensuring Coherence and Science's Ability to Meet the Expectations of Society

In his speech, Edouard Balladur firstly thanked all participants in the consultation process. "I agreed to open this synthesis colloquium this morning to express to you the very great importance I attach to research and to tell you what the whole country expects of researchers. Research in France (...) is a strategic factor. Looking beyond its solely economic aspects, its excellence contributes to the recognition of our country in the world (...). Today science must rise to this very real challenge to ensure it is better integrated into society (...). A number of very telling problems were raised throughout the national consultation process, and the richness of the analyses and answers you provided will, I am sure, enable the government, parliament, and our citizens to arrive at a true analysis of our system of research and its place in society. We also need to obtain a strategic view of

public research work. In this way, the higher education and research minister will be able to go about making the choices, in association with the scientific community, that will form the basis of a real research policy."

A Strategic Vision for Research

In his closing speech, Francois Fillon stressed the need to "redouble our efforts to spread the scientific spirit, popularize science, and bring the general public into its debates. The world of research must therefore establish dialogue and tirelessly explain its action. The political world must trace clear perspectives to illustrate that the problems we are faced with today, however serious they may be, do have a solution (...)."

Thus informed by the national consultation process, the minister stated that this would then make it possible to "draw up the balance sheet of what has been done, and open up new avenues of approach for the action that remains to be taken (...). I have been particularly struck by the diversity of the orientations suggested. If they have appeared contradictory, it is because all positions were expressed freely (...)."

Guiding Principles

"Since a research policy is constructed in the medium-term, changes will only be durable if they are based on what has already been achieved. We must know how to act and reform, but that assumes that we have first adopted clear aims, determined in close concert with those who are concerned by the action being undertaken (...). The national consultation process has shown that an approach that is too interventionist and the temptations of technological mercantilism have tended to overly restrict research and block mobility, innovation, efficiency and, in a word, dynamism. While a degree of planning for the resources assigned to major outfitting, applied research, and the transfer of technology may be justified, it is however illusory to guide discoveries in basic research. At the same time, we have to admit that we had no choice but to return to a situation that was more in line with the resources that are in reality available (...). The political risks and budgets have progressively guided our hand to the detriment of any coherence (...). The issue here is not the legitimacy of the state to play a structuring role in the field of research, but rather the way in which it acts."

"One of the main lessons the process of national consultation has taught us is the need to adapt the role of the public authority to the new realities of science and society. The state must reinvest in research, but reinvest in a different way. The state must be concerned not only with the collective dimension of scientific work, but it must also recognize how essential it is that those involved in research retain their autonomy. The state must better take into account the central role to be played by laboratories and research teams. The state will also have to delegate more to favor initiative and promote cooperation without losing its power to guide research. Above all, however, the state must rediscover its main mission, that of being able to give the national community the means of generating a strategic vision for research. First and foremost, this will come through maintaining and increasing the effort made by the state to finance public research to ensure fairness in production and access to knowledge (...). The state must

ensure that the awarding of public funds does not depend on a cut and dried choice between basic and finalized research, between academic and industrial research, and between certain scientific fields and others (...). When all these principles have been laid down, we still have to work out clear directions that are validated and that can be regularly reassessed (...)."

Clarify What is at Stake, Determine a Strategy and Implement It

"To assume this mission, the state must perform three essential functions: clarify what is at stake, decide on a strategy, and then participate in its implementation (...)."

"Clarifying what is at stake means organizing a permanent process of reflection upline of the choices of national research by combining the approaches and objectives of both the participants and users of science. This will also simplify the decisions that will have to be made to identify a clear strategy (...)."

"The time has come for us to quickly set in place the mechanism for strategic reflection that we so lack. This will have to be a powerful and permanent body, involving all sectors of activity and the whole of the civil research and development budget, and must be based on a renewed effort of scientific forecasting and technology watch."

"I will illustrate how we can participate in the implementation of strategic orientations (...) using four vital domains of public action (...)."

"Public research: We must (...) encourage closer links between the authorities, higher education, and university research by finally creating the conditions for a truly fruitful mobility (...). Above all, however, public research must be in the forefront of the nation's scientific strategy. The availability of the public bodies is an advantage in this respect, on condition that we can federate this potential around the main selected options through effective inter-body concertation and a flexible forecasting of how they will evolve. These aims will be met by a contract between the state and the various participants in the national research effort (...), contracts that must give the state the opportunity to more precisely specify its strategic priorities (...)."

"Geographical spread: The need for excellence in French science requires a selective policy of grouping activity by poles of specialist skills, and the close proximity to certain industrial and university centers, carefully interwoven with other efforts in local development. The siting of laboratories in the regions (...) will require the cooperation of the scientific community and cannot be done without it (...)."

"The question then arises of the distribution of the skills between the different levels of the state, the regions, the Community, and the international level (...). At national level, we must ensure the decentralization of researchers and contracting, and the state's participation in the implementation of the strategic choices made (...)."

"At Community level (...) basic research can only be considered as an area in which it is impossible to envisage the transfer of know-how through the European Union (...)."

"Looking beyond the Community, the state must initiate multilateral negotiations in the light of the increasing globalization of research in disciplines requiring major

resources (...). We must be especially aware of the position and rank of French and European science in these multilateral programs (...)."

"Those issues that touch upon the future of North-South relations also, for France, represent a major stake for the years to come (...)."

Research and Industry

"Strengthening company research assumes giving priority to the demand for innovative technologies and processes (...). The competitiveness of the country in future years will in particular depend on our ability to favor technological partnerships between public research and industrial research. The state's priority in its regulatory role and its role of a promoter of industrial research is notably the result of an analysis of the requirements of small and medium-sized companies and industries, and sectors with an average technological intensity where we need to make up lost ground. In this area, there is no single model—the tried and tested solutions are adapted on a case by case basis to suit the regions, the size of the companies, and the sectors concerned (...)."

"Risk capital has made little progress in France (...). Similarly, we have not sufficiently developed contracted research companies (...). Let us help business overcome the hurdle of the cost of switching from the results of research to the development of new products (...)."

"Looking beyond the financial aspects, a second key requirement expressed by business concerns the skills available: networks and manpower (...). Developing skills for the company in particular implies a renewed effort on the part of the state in favor of technology in higher education (...)."

Professional Careers

"We must maintain and attach greater value to the research professions (...). The scientific rigor and expertise that characterize the training of a researcher must, more than ever, be put at the service of the whole of society (...). The aim must be to quickly offer everyone the choice of a multi-functional career, opening up the possibility of alternating tasks between researching in a body or university, training in an institute of higher education, generating innovation for a company, and working on the international plane. To succeed in this aim, simple procedures will have to be established which are compatible with the status of the public function (...). This functional mobility must be freely available, must increase the value of a job, and must be subjected to rigorous evaluation (...). It must be accompanied by a continued recruitment drive. We are entering a period of intense rejuvenation, linked in particular to an increased number of retirements. If we are to maintain our research potential, then the state must be able to avoid hiccups by ensuring a sufficient flow, not just of young doctors but also of engineers, technicians, and administrative staff whose importance in the laboratories is widely recognized."

France: Government Said To Plan R&D Credit 'Freeze'

BR2706140694 Paris LE MONDE in French
9 Jun 94 p 12

[Jean-Francois Augereau and Michel Delierghe report: "Government Wants To 'Freeze' Large Part Of Research Credits"]

[Text] "If we intended to cut the budget allocated to research, then I would not have initiated this national debate," Higher Education and Research Minister Francois Fillon assured a month and a half ago during the colloquium devoted to "national consultation on the broad objectives of French research." Today, however, faced with an urgent request by the Budget Department to freeze 8 percent of the credits—excluding wages—for research, Mr. Fillon must regret that statement which was just a little presumptuous.

The story falters. Grippled by serious concerns, those in the research domain see in this request—which is so far only unofficial—the beginnings of a return to the "pocket-calculator policy" implemented in April 1986 by the staff of [Foreign Minister] Alain Juppe, who was at the time the minister delegate responsible for the budget. This policy made research alone bear 54 percent of total program cancellations, taking all ministries together.

[Budget Minister] Mr. Sarkozy's departments, which were subtler—or more cautious—did not let themselves go to such extremes. However, it must be acknowledged that "the cherished child of the republic" is once again at risk of being put on a bread-and-water diet. The situation is all the more delicate because research has endured several attacks since the last legislative elections. The first was in May 1993 when the departments in charge of the budget—applying the austerity policy decided on by the government—decided to reduce payment credits—the nerve center for every activity—by 288 million French francs [Fr] and the payment credits for program authorizations—the allocation of which conditions the future—by Fr795 million.

A Series Of Savings

A fresh push was made a few months later during the presentation of the 1994 budget, which allocated Fr52.56 billion¹ to research, a rise of barely 1.2 percent compared to the corrective financial law for 1993. The result was that program authorizations dropped sharply (down 4.75 percent) for all the large research organizations (CNRS [National Center for Scientific Research], CEA [Atomic Energy Commission], INRA [National Institute for Agronomic Research], IFREMER [French Research Institute for Exploiting the Sea], INSERM [National Institute for Health and Medical Research], INRIA [National Institute for Research into Information Technology and Automation], etc.). Those are the ones which are once again at risk of suffering from new credit freezes.

The researchers have scarcely any doubt that as the months go by these freezes will turn into outright cancellations. The method is not a new one. Everyone knows that while the freeze in principle allows the managers of organizations to defend the cause of certain highly sensitive cases, exceptions are rare and generally only lead to modest unfreezing. The generally accepted opinion is that because

of the threats floating around today the situation for ordinary expenditure as well as payment credits and program authorizations is becoming extremely critical.

According to our information, ordinary expenditure—excluding wages—and payment credits could be slashed by just under Fr400 million, while ordinary expenditure and program authorizations could be cut by just over Fr500 million. What do the figures mean? While many people understand that austerity in a period of shortage is a necessary evil, they feel it would have been preferable—for the programs to be correctly managed—to announce the savings to be made at the beginning of the year and not to force the financial departments at these establishments to make "incredible contortions" just as summer is about to start. While awaiting official notification of the real amount of the freeze on research credits, nobody doubts that negotiations are well under way to obtain more bearable arbitration. On the eve of the submission of his guideline report to parliament on 21 June, Mr. Fillon is probably trying to lighten the bill—especially since the allocation proceedings for the 1995 budget once again have nothing encouraging to offer.

Tense Situation In Higher Education

At the same time, within his two-headed ministry, the research and higher education minister must face an especially tense situation in higher education, which is supposed to be a "government priority." According to trade union sources, the mechanical application of an 8-percent freeze would mean carrying forward Fr216 million in university operating credits and Fr200 million in research credits for university laboratories out of a total budget of Fr42 billion.

For the time being, "no directive has come to the establishments," Bernard Dizambourg, first deputy chairman of the conference of university presidents, which is daring to hope for a more favorable outcome in the immediate future, said. Although certain establishments have begun drawing up alternative scenarios, they have not been given any practical indications. Indeed, the details of the planned measures should be spelled out during the next conference of presidents on Wednesday 16 June.

On that day, the meeting is likely to be a stormy one if Mr. Fillon is not in a position to make any guarantees—especially regarding the upcoming university year. With 7 percent extra staff—in addition to 2 million students and the opening of new buildings under the University 2000 plan which will have to be equipped with staff and materials—the prospect of fresh restrictions can only serve to awaken the simmering discontent which manifested itself here and there during the spring. Despite the announcement of an extra 675 jobs on top of the 1,200 jobs initially planned, 1994 marks a break in the pace of job creation since 1991. There is now an extreme shortage of administrative and technical posts (150 new jobs in the 1994), something which has been denounced by all universities.

"Credits can be eliminated, not students," an official from Louis Pasteur University in Strasbourg—not one of the worst off, far from it—said. According to him, his budget will be brought down to the 1991 level, despite a 20-percent staff increase. The financial reserves for confronting emergency situations in the beginning of the

academic year—for which Mr. Fillon has so far refused to reveal the amount—should not be affected. In the cabinet, they are assuring us that this is a decision confirmed by the prime minister. It is not certain, however, that this assurance—which is unconfirmed—will be enough. On 15 June, Mr. Fillon is to announce the new arrangement for technological training at the university which, according to him, will “require an extra effort by the state.” This effort seems far from a certainty.

Footnote:

1. Ordinary expenditure, plus program authorization. The budget in ordinary expenditure—wages for the most part—and payment credits were Fr51.59 billion, an increase of 3.68 percent.

Germany: BMFT Funds Genome R&D Project

*BR0106104494 Graefelfing BIOENGINEERING
in German Apr-May 94 p 7*

[Text] The Federal Ministry of Research and Technology (BMFT) launched a new genome research funding scheme entitled “Techniques for Deciphering and Exploiting Biological Blueprints” under its “Biotechnology 2000” funding program at the beginning of 1994. About 100 million German marks have been set aside for these funding measures over the next five years.

First and foremost, R&D work on these topics sets out to achieve a breakthrough in terms of higher-quality, cheaper products and processes for use in medicine, the pharmaceutical industry, and plant breeding. For instance, it includes efforts to elucidate the molecular causes of serious illnesses as a basis for devising a successful therapy. New methods and procedures for use in structural genome analysis or in identifying the functions of complex genome portions play a key role in this connection.

Another example is the need to cut development times (in other words, lower costs) and raise the specific efficacy of drugs. This requires a breakthrough in absolutely new molecule synthesis methods. Evolutive biotechnology, a new concept worldwide that is working on the industrial exploitation of the molecular synthesis and optimization processes used in biology, is gaining increasing importance in this connection.

The intention is to boost R&D work on developing novel techniques so that the structures and functions of the molecular blueprints of biological cells can be deciphered and used as a basis for the development of innovative products and processes. This requires a combination of new branches of molecular biology and various technical disciplines, such as microsystems engineering, automation, chemistry, and molecular analysis.

The new funding measures are designed to strengthen the direct link between modern biology and technical sciences in particularly innovative areas and to bring together outstanding basic biological research work and productive industrial R&D facilities.

The provisional establishment of interdisciplinary, cross-sector technology transfer centers at appropriate research facilities will also be funded under the new scheme with a view to accelerating the spread of new methods and

techniques in practice. Projects of this type in the new federal laender are accorded particularly high priority.

The funding scheme links up directly with other BMFT programs on medical diagnostics and therapy, molecular research into naturally occurring substances, plant breeding, biological safety, and bioinformatics, and with institutional R&D work. It reinforces genome research work promoted by the German Research Association (DFG) and Max Planck Society (MPG) and complements the EC's genome analysis projects by setting out to create the requisite methodological and technical base.

The BMFT describes the new funding scheme as the result of a wide-ranging dialogue conducted by science, industry, and state, its implementation requiring and fostering new interdisciplinary structures in research and industry. This, says the ministry, promotes flexibility and willingness to take risks, from basic research right up to the production stage. The new funding scheme also stresses the rapid conversion of basic research findings into industrial products, processes, and medical applications, thus contributing toward the acquisition of competitive market positions.

Germany: Nuclear Research Center Reorients R&D

*MI2705111994 Munich SUEDEUTSCHE ZEITUNG
in German 5 May 94 p 24*

[Article by Jeanne Rubner: “Research Tanker Steers a New Course—Rossendorf Focuses on Materials Science and Reclaiming the Uranium Mining Area”]

[Text] No, the entrance is by no means imposing. Were it not for a rusting sculpture of the Greek letter psi surrounded by spheres in elliptic orbits—symbolizing atomic physics—one could drive straight past the gate of the Rossendorf research site near Dresden without even noticing it. Nevertheless, with close to 2,000 employees, the former GDR [German Democratic Republic] Central Institute of Nuclear Research used to be the largest Academy of Sciences facility, indeed the largest research institute in the whole of the east.

Even today, the site, with its barbed wire fence and drab buildings, hardly beckons invitingly to visitors. Perhaps it is not meant to, for radioactive waste from the research reactor, which has now been shut down, has been dumped in the Rossendorf woods. “Things were easier in GDR days,” says Gudrun Zwicker, formerly a physicist in Rossendorf and now consultant to the scientific director, Wolf Haelele. “In those days the waste went to Morsleben.” This permanent store has now been closed. The nuclear laboratory had to be sealed up overnight after unification. Many employees with the requisite know-how have been dismissed, says Zwicker.

A reprocessing company now looks after radioactive waste disposal. It was founded in 1992 and employs a staff of 130. The waste problem is “highly complex and technically difficult,” says Haelele, who was previously the director of the Juelich Nuclear Research Center. The disposal work will keep the company busy for 15 to 20 years, he believes.

Problems Specific to the East

The five Rossendorf Research Center institutes that are currently operative came into being two years ago, some of

them growing out of the sectors positively assessed by the Science Council. In the same way that the Karlsruhe and Juelich nuclear research centers are looking around for new tasks, whether in brain or environmental research, a new profile is also being sought in Rossendorf. Problems specific to the east compound the problems also experienced in the west in such attempts to steer a cumbersome "research tanker" onto a new course. Unlike Karlsruhe and Juelich, Rossendorf is not a major research facility, but what is known as a Blue List institute, which is consequently only 50-percent—and not 90-percent—financed by the Federal Government. The Land of Saxony, which is not exactly one of the richest laender, foots the other half of the bill. Apart from the new institute directors, some of whom come from the west, almost all the 450 permanent employees were inherited from GDR days. Their average age is very high, and as a result many of them are finding it difficult to adjust to the changeover. To add to the problems, there is considerable feeling of insecurity among the researchers.

Indeed, it is not yet known whether all the institutes can actually carry on in their current form. For example, the Institute of Nuclear and Hadron Physics is the only one of its kind left in eastern Europe. However, competition in this field of research, which is nevertheless slowly becoming extinct, is considerable in the West. So is the institute still needed? It also has the problem that its director designate has backed out. There is thus also some doubt as to whether the planned electron accelerator will be built.

If it is not, it is unlikely that there will be a major facility in Rossendorf in the foreseeable future, as the research reactor, a neutron source previously used for materials research and for the production of isotopes for medical applications, has been shut down, contrary to the Science Council's recommendations. The federal research minister in office at the time was unwilling to spend the 60 million German marks that it would have cost to bring the reactor, which had been renovated immediately prior to the German unification, up to "western standards."

Anxieties About the Future

The Institute of Safety Research, too, has grounds for anxiety as to its future. It has to date been working on Soviet-type reactors, but since the Greifswald pile was shut down there have been none left in the Federal Republic. The Science Council met last week to discuss the future of Rossendorf and will pronounce judgment in mid-May.

The prospects look better for the Institute of Ion Beam Physics and Materials Research, where the focus is on electrically-charged atom beam applications in surface treatment and materials research, things it was doing, at least in part, before the unification. "At that time, our scientists were competitive," says director Wolfhard Moeller, "although much of the apparatus was hopelessly obsolete." This situation has changed since then, the laboratories now boasting several ultramodern ion accelerators and the institute being the biggest of its kind in Europe.

The researchers there use a method, developed back in GDR days, of extraordinary interest to art historians, as they use proton beams to study works of art. The charged nuclear components penetrate the layers close to the surface, and the radiation emitted (X-ray waves, or protons

themselves) makes it possible to identify the chemical elements contained in the colors used in a painting, for instance. The applications for this noninvasive test procedure are self-evident: If the yellow, for example, is not a lead and tin mixture but a chrome mix not available in the middle ages, whereas the painting is attributed to that period, it could be a fake.

The institute is also engaged in work on miniature sensors. Sophisticated instruments have usually been needed to date to detect certain pollutants in the environment, especially when they occur in minute quantities. The intention is therefore to build sensitive sensors that can be produced cheaply and on an industrial scale for deployment on numerous sites. The individual components required are already available: special semiconductor devices known as ion-sensitive field-effect transistors measure concentrations of substances in, for instance, a water sample. Liquids are fed through by micropumps and valves.

Measuring Ion Levels in the Blood

The time has now come to combine these components on a small silicon wafer, thus creating a complete, autonomous measuring system capable of handling small samples. A system of this type could also be of interest to the medical profession, for measuring ion levels in the blood, for instance. The Rossendorf researchers have now succeeded in building a pump that is incorporated into the silicon wafer. It measures 1 centimeter square and can flush 1 microliter of liquid per hour through a fine pore. The scientists hope to present a complete measuring system within the next few months.

Another institute in Rossendorf, the Radiation Chemistry Institute, is endeavoring to assist Wismut GmbH with reclamation work on the former uranium mine. "About 250,000 tons of uranium ore have been mined in Saxony and Thuringia since 1945. The earth was completely raped by pumping acids in," says Heino Nitsche, director of the institute. Gigantic contaminated areas, shafts, and slagheaps are the result.

Controversy as To Correct Reclamation Method

The experts are still arguing over the best way to clean the area up. In any case, however, the salvage work will cost a great deal of money. "So it is worthwhile getting the basic principles straight to start with," says Nitsche. In other words, how does radioactivity spread in the air and soil, how do the rock and water strata interact with one another, and what by-products are formed when uranium decomposes? "There are already models that describe the spread of radioactive substances, for example," says Nitsche. All they need to obtain accurate forecasts is precise input data, and this is where the scientist comes in.

FRG Expert on Interdisciplinary Research, New Materials

94WS0358A Stuttgart BILD DER WISSENSCHAFT
in German May 94 pp 88-89

[Interview with Professor Helmut Schmidt, head of the Institute for New Materials, by Wolfgang Hess; date and place not given: "No Money Without Performance;" first paragraph is BDW introduction]

[Text] Dr. Helmut Schmidt, born 1941, is professor of materials science at the University of the Saarland as well as managing director of the Institute for New Materials (INM) in Saarbruecken. According to a recommendation by the Science Council, the INM is now to be included on the "Blue List" and will then be one of the independent research institutions jointly supported by the Federal Government and the Laender.

[Hess] German scientists take little interest in testing their discoveries by means of practical applications. Why is that, Professor Schmidt?

[Schmidt] Time and again I hear from my colleagues: Applications are not our task, that is the business of industry. This thinking has to do with the fact that the German scientists are still marked by Humboldt's thinking, that is to say they regard their work as removed from the seamy side of application. In addition, most people are intent on protecting their positions once they have acquired them. That is most easily done by clearly outlining your terrain and cutting yourself off from the outside. In science, above all, this kind of specialization has become established as a career principle.

[Hess] And despite that researchers like to talk about interdisciplinary work.

[Schmidt] Everyone talks about it. But practicing it is something else.

[Hess] Does that mean that this approach to thinking, which has been called for for years, in most cases has remained lip service?

[Schmidt] The situation has improved, but we still encounter boundaries. This is because of our research structures, which only permit a certain measure of interdisciplinary cooperation. You would trigger a war if you were to state to a teacher at an academic institution: Your research is not relevant, so from now on you should do something else. Most people are sensitive about that. Anyone who really wants to do interdisciplinary research must give up a piece of his own sovereignty. This can only be done voluntarily. But volunteerism is difficult to manage, and for that reason you quickly encounter organizational limits.

[Hess] What do you suggest?

[Schmidt] I know of no patent prescriptions. We cannot shake up the researchers from one day to the next. At new institutes, on the other hand, we have an opportunity to establish research structures which support the interdisciplinary approach. We at the Institute for New Materials, for example, have drawn the departmental boundaries in such a way that nothing works without overlapping cooperation.

[Hess] What does that mean?

[Schmidt] We have five strategic levels, all of which are interlinking: The basic research level works with new materials, methods and phenomena. On the second level are industrial cooperations with powerful enterprises in which normally risky developments are pursued over a period of three to five years. Further, there is the level of adjustment projects for materials applications in medium-sized enterprises. The fourth level is implementation at

comparatively low cost for small and medium-sized enterprises. And, fifth, through a marketing company we evaluate know-how that has been left behind. By using specific resource control, we have direct access to the individual departments.

[Hess] What do you mean by resource control?

[Schmidt] The corporation has a board of directors, shareholders and an objective laid down in the articles of incorporation. Should one of our department heads say, for example: "What do I care about planning? I am a free researcher with the title of professor," then the board of directors can see to it through its performance control that his resources disappear.

[Hess] You have to pay your employees according to the rules of public service. You do not have a great deal of room to move.

[Schmidt] As long as we acquire enough third-party funds we can create more high-paid positions in the area financed with them, within the framework of the Federal Employee Wage Scale and in individual cases even compensate outside the wage scale. Furthermore, we can demand market prices for our services, that is to say establish an accounting that covers our costs.

[Hess] Do we need a research minister, who—just as Health Minister Seehofer—destroys established and perhaps also traditional institutions?

[Schmidt] The institutions of the German research landscape are divided into many facets. Accordingly, a research minister cannot do anything other than surround himself with experts who have sufficient expertise. Since these experts necessarily must come from the established research landscape, only those expert opinions and recommendations will land on the minister's desk, which on the whole recommend what already exists. There will be no massive restructuring of the traditional establishments. That cannot be done with the sociopolitical landscape we have either.

[Hess] Why?

[Schmidt] Even if just one of the established government research institutions were to be outfitted with a clever and application-oriented management, many famous researchers would immediately oppose the plan and declare that precisely this measure would endanger the future of the nation. There are heaps of arguments which describe the existing system as the best one proven. For that reason the question must not be: Which successes has it been possible to record so far? Instead, it should be: Could one not have achieved more with the same use of resources?

[Hess] Now there are more and more management consultants who are starting to think about more efficient research.

[Schmidt] After all, management consultants do not do anything other than make use of established experts. Ultimately, management consultants therefore maintain status quo.

[Hess] With your thinking, you belong to the outsiders in the circles of science.

[Schmidt] That is right. On the other hand, I also see the result. Many approaches have already been implemented in the BMFT's [Federal Ministry for Research and Technology] new materials research program. In addition, the success of our institute proves me right. Now, we have 150 employees with a budget of 15 million German marks.

[Hess] When talking about materials research, the concept "new materials" is used in the same breath. What is the difference between new materials and further developments of conventional materials?

[Schmidt] In the development of new materials, research is today increasingly focused on the basis for new systems. What that means can be marvelously illustrated by the ceramic valve for the Otto engine. Silicon nitride as a valve material is a clever innovation. Applied to the progress related to it in System Motor, the result is far less exciting. The fuel savings connected with it have been marginal so far. That is why I consider it much more important to orient material developments toward the area where the greatest system innovations can be expected. This is precisely what the BMFT has also taken into account in its most recent materials research program.

[Hess] Surely you also know some success stories which prove your view.

[Schmidt] The grated-index-optic-systems in copying machines are a prime example. These were able to replace the large and expensive lens systems. That was the decisive system innovation for the Japanese victory march in fax machines. An example of our own development is the electrochromic glasses. The basic principles have long been known. But our development can make a manageable, inexpensive technology out of them. Such electrochromic windows are of major interest in houses as well as cars, because with them it can be individually determined how much sunlight may enter.

[Hess] Before the end of last year you told us: "Many companies could use tailor-made materials, but the German chemical giants are withdrawing from development because they do not envision any significant profits." Are you still of that opinion?

[Schmidt] Processes of rethinking are evident. Smaller giants—such as Merck or Condea, the chemical subsidiary of the petroleum group Dea—are beginning to work more intensely in this direction. Major enterprises are also moving now. But in Japan they went a different way. There, electronics groups or auto manufacturers supplied themselves with the required know-how by buying up material development companies. Japanese enterprises are therefore able to design or modify materials from the application side.

[Hess] Is Japan once again a bit ahead?

[Schmidt] The innovation eagerness of the Japanese lies not so much in the fact that they deliver materials to us which we do not produce. Their strength is primarily that they conjure up completely new systems from new materials. Thus, the LCD technology, in which the Japanese are the leaders of the world, is based primarily on materials developments.

[Hess] Research institutions in Germany live on, even if they no longer provide any inspiration. This is verified by many examples. What does it look like in your institute, Professor Schmidt?

[Schmidt] I can definitely be relieved of my responsibility for the INM or for my research department. The board of directors of the corporation can decide to do that.

[Hess] But that does not happen, because the scientific community does not hurt itself mutually, as you yourself complain by using other examples.

[Schmidt] The shareholders of a corporation have the opportunity to select its board in such a way that afterward it does not act as a closed club. Our board of directors is composed of representatives of industry, research and banks. I do not think that this illustrious body would tolerate a deadweight at the top for very long.

Acute Shortage of German Science Professors Forecast

94WS0379A Duesseldorf VDI NACHRICHTEN
in German No 21, 27 May 94 p 14

[Article by Stefan Willeke: "Small Interest in a Career in Science"]

[Text] Bochum (VDI-N)—The Science Council is sounding the alarm: while the number of scientists qualifying for lectureships is stagnating, a total of just under 4,000 professors will be leaving in the next 5 years for reasons of age. In the engineering sciences the age of those newly qualified is already well above average.

It was impossible to find anyone to fill the Hamburg professorship of "operations research," even though the position had been advertised many times. Applicants are rare, and the few who apply are "not suitable," according to Prof. Georg Tolkemitt, faculty spokesman for economic sciences at Hamburg University.

He said that it is more and more difficult to find qualified candidates, particularly for C-3 professorships. This is particularly true for the law-oriented chairs within his area of expertise. "Sometimes we have only five or six candidates, only one of whom is worth considering. But we need to present a list with three names," Tolkemitt says regretfully.

The result is that appointment procedures are excessively drawn out and that the quality of research and teaching necessarily suffers. Because qualified scientists are taking better-paying jobs in the private sector, the departments are finding it harder and harder to fill their chairs. And the slim quota of chairs in times of public austerity measures does nothing to add to the attraction of professorships. "The financial temptations of the private sector are very great," agrees Juergen Blohm, spokesman of the German Higher Education Association.

The general secretary of the Science Council in Cologne, Dr. Winfried Benz, recently evaluated the relevant data from the Federal Bureau of Statistics and has come to an "intolerable" conclusion: engineering scientists who have just qualified for a lectureship are 41.2 years old on average. But the mean value for those who have recently

qualified for all subjects is now at 39.4 years. Only mathematicians (34 years) are an exception.

In general, qualifying for lectureships is not a high priority for engineers. Benz's calculations of "qualification intensity," i.e., of the number of qualifications compared to the number of doctoral degrees, reveal that the rate of qualifying was almost 38 percent lower in 1991 than it was in 1980. In contrast, the "degree intensity," i.e., the number of doctoral degrees in comparison to the number of first degrees, rose by almost 62 percent in this time period. The individual results drop particularly sharply in the case of civil engineers. Those of them who have qualified are 41.9 years old on average, while qualification is even rarer than in the engineering division.

The reasons for the relatively small interest which engineers who have taken their degrees show in qualifying are very practical: for one thing, heads of personnel are very cautious when they are faced with the choice of employing an engineer who has qualified for a lectureship. This is not only because of the question of age, but particularly because of the uncertainty about whether the newly appointed manager might not be called to a university chair within a couple of years.

Anyone considering a career in industry cannot "sell himself with a lectureship qualification on his resume," says Heinz-Dieter Papenfuss, professor of mechanical engineering at Bochum. Prof. Wolfgang Massberg, former president of the Ruhr University in Bochum, and director of the Expert Commission for Mechanical Engineering Departments in North Rhine-Westphalia, says that qualifying destroys "any chance for a career in industry" for an engineer with an advanced degree.

In the second place, qualifying is not even necessary in many cases in order to be appointed by a university as a doctor of engineering. The reason is that so-called "qualification-equivalent achievements" are sufficient for engineers and information scientists as an equivalent based on experience. This means at least 5 years of practical experience in connection with scientific publications or prizes and patent claims.

Only one in four newly appointed professors in Massberg's department in Bochum has qualified. Most take the usual route in engineering circles: within the context of industrial activity, you publish for years in professional journals until finally the question arises of whether you wish to apply for a professorship. This has the advantage of leaving you "untainted" for your prior employers up until being appointed. In addition, Papenfuss says that the subject of qualification is generally "uninteresting for industry." In contrast to doctors, who qualify with remarkable frequency and are allowed to call themselves private lecturers, the professor of mechanical engineering believes that "such motives of prestige" do not count for engineers.

Qualifying in the engineering sciences is only necessary for theoretically-oriented subjects such as thermodynamics. That is why most engineering departments do not (yet) see the falling popularity of qualification as dramatic.

Nevertheless, the high average age of those who have qualified in the engineering sciences can scarcely contribute to improvements in scientific achievements. Benz

believes that "the most creative time is over at 40." Even the age of those who have a doctorate in technical subjects (33.2 years) is higher than the overall average (31.8 years).

The threat of aging which begins to loom increasingly at the beginning of the doctoral process is seen as "striking" by Michael Schuster, who is responsible for qualification grants at the German Research Society (DFG). What is only guessed at by Schuster is confirmed by many college teachers: the time which doctoral candidates and candidates for qualification have to sacrifice for extraneous activities under a professor delays the process enormously.

Because of the burgeoning shortage of personnel, the rising scientists are popular candidates to be roped in for the preparation or giving of seminars, smothered in administrative duties and thus kept from their own researches. Because of these additional burdens, it frequently takes 5 years for graduates to present their doctoral dissertations, as Tolkemitt knows. The subsequent path to a qualifying thesis often takes another 5-7 years.

The Science Council is therefore supporting the extension of stipends and graduate courses in order to focus on the essentials and to shorten the "qualification phases." But Tolkemitt warns that the requirements cannot be lowered, for that would have a boomerang effect: "It must still be difficult to qualify."

Germany: Controversial Report on Large Research Institutes

94P60267A Duesseldorf HANDELSBLATT in German
4 Jun 94 p 4

[Text] In Bonn a vigorous controversy has arisen about the proposals by industry to have the 16 large-scale research institutes concentrate more on applications. The Ministry for Research, Scientists, and Industry agreed on the strategy for production in the 21st century.

The share of project-related research, only 30 percent at present, must be raised. This was demanded by Hartmut Weule, the Daimler-Benz AG board member responsible for research and technology, during the presentation of a report on the Juelich Nuclear Research Facility (KFA) and the Karlsruhe Nuclear Research Center (KFK). One year ago, FRG Minister for Research Paul Krueger appointed a group of representatives from industrial research—Daimler, Siemens, BASF, Maschinen-und Anlagebau—to investigate cooperation between industry and the 16 large research centers. These centers consume a fourth of the total Bonn research budget of 9.4 billion German marks [DM].

Under the chairmanship of Weule, the commission issued a report which urged the government to raise the share of applications-oriented research to 75 percent within the next three to five years. Moreover, one should apply tested planning and control mechanisms to the large research institutes. The commission also proposed that the political authorities should set the guidelines for the distribution of research funds and then decide on awarding these funds in cooperation with the key industrial branches of automobiles, machine tools, electronics, and chemicals.

When he received the report, Krueger gave a very differentiated response. On the one hand he noted the special

role of the large research institutes in preventive and basic research and long term projects. On the other hand he urged that contact with industry should not be delayed until the research results were available, especially in the areas of research which are relevant to industry. The state will see to it that there is a "balanced relationship" among the various areas of research, he said.

The SPD gave a rather negative reaction to the report, which had been eagerly awaited. If German industry asks for industrial relevance in 75 percent of the large research institutes' activities, then it should pay 75 percent of the costs, said Josef Vosen, the research policy spokesman of the SPD [Social Democratic Party] Bundestag caucus. He assessed the proposal as an attempt by industry to meet its own financial difficulties by "digging deep in the pockets of the state" instead.

The scientific organizations also argued against the report. Wolfgang Fruehwald, president of the German Research Association (DFG), spoke against too much planning of research and orienting it toward short-term application goals. This would cut research off from its vital source, the "disinterested curiosity" of scientists. Industry, scientific organizations, and the state agreed in their report on strategies for production in the 21st century. The complexity of products, production processes and systems must be mastered better, said Minister Krueger. At the same time, production processes and products should become more favorable to the environment. The results of the report are to be implemented in a research project "Production 2000," for which the research minister will provide about DM100 million annually, starting in 1995.

Italy: Research Minister Speaks On Aerospace Needs

MI1404093894 Rome AIR PRESS in Italian 14 Mar 94 pp 487-488

[Text] "Public research institutes are an extremely important resource and they must be used in the best possible way. It is also necessary to get the Italian Space Agency fully functional again, so that it carries out and directs research and industrial development in the space sector, a sector that is characterized by growing European and international integration." This is what Italian University and Research Minister Umberto Colombo said in the speech he made in Rome on 7 March when the European Union's fourth research plan (1994-98) was officially presented in Italy for the first time. European Commissioner Antonio Ruberti was also present.

Realistically Redefining Italian Space Policy

Colombo recalled how much the government, which he is part of, has worked "to improve the efficiency of the actions and instruments of scientific and technological policy that the country has at its disposal," taking into account, "in the difficult 1994," the serious economic situation in Italy and the need to limit public expenditure "as much as possible." "In other words," our minister continued, "before asking the government and parliament, and finally the taxpayers, for the increase in the public commitment to research that we think is necessary, we considered it our duty to demonstrate that every effort had

been made to reduce the waste and inefficiency that existed alongside a situation in which there were meager resources for research."

Amongst the various interventions that have come into effect "in a moment of economic difficulty that does not allow the resources of the ministry" under Umberto Colombo "to be increased," the latter indicated that of "redefining Italian space policy in a realistic way in the context of necessary international collaboration and getting the Italian Space Agency to function normally again. The government has recently nominated the new president of the Italian Space Agency and its new board of directors." He also pointed out that "supporting instruments had been activated for the national aeronautical industry that must be able to develop by participating in the European integration that is underway, and in the widest international collaboration, in conditions that are not disadvantageous."

The fourth community research plan should start definitively on Monday 21 March when the Council of Ministers of the European Community will give its definitive "placet," after the disagreements with the European Parliament that up to now has slowed down the approval of the lines of research and the allocation of resources. "Work is being done to reach an agreement between the European institutions and there is a good chance of obtaining positive results," said Ruberti. He echoed Colombo, affirming that "if the plan is given definitive approval on 21 March, the merit for this will also go to Italy, because it has shown itself to have greater attachment to European ideals than other countries who are more worried about obtaining general advantages."

In terms of money, the program represents ECU12 trillion (equal to 23 trillion lire) to be allocated over the period from 1994 to 1998. A little less than 88 percent (87.8 percent to be precise) of the total resources allocated will go to the first line of action, that regarding research and technological development programs and demonstrations. Within this line of action 28.20 percent of the resources will be absorbed by the information technologies.

With Reference To Article 130k...

AIR PRESS has already spoken about the fourth plan more than once, drawing attention to the absence of a specific "aeronautics" item, an absence that has been lamented and has also been underlined by various interventions at an industrial level, not only by Italy but also by others, led by the French.

AIR PRESS asked both Commissioner Ruberti and Minister Colombo what could be done to sidestep this deficiency, which is even more significant if you think about the competition from the United States. "That is a good question," replied Ruberti, who is following the problem closely, because, in his opinion "the aeronautical industry is vital for Europe." According to the research commissioner it is necessary to see "what to do in the fourth plan about resources for the sectors that are in crisis," trying to make the sectors within this type of plan "that has a horizontal structure" take on "a vertical structure." One of these sectors is aeronautics. Here there is a chance for a mixed group, with the participation of industry, "that

needs to see what it wants to do," to coordinate the sector and put complementary programs into effect.

According to Ruberti this has been made feasible by Article 130K of the treaty of the European Union, an article (Publication 15—Technological Research and Development) that establishes that "during the implementation of the plan, that covers a number of years, complementary programs can be decided upon in which only certain member states participate and for which these states assure the funding, unless the Community should decide to participate in them.

The council adopts the regulations that are applicable to complementary programs, in particular on the subject of the divulgation of knowledge and of access by other member states. If the states belonging to the Community want to "they can also have sectarian programs" precisely in virtue of Article 130K, but, according to Commissioner Ruberti, "the true line to follow is that of a supporting policy" conducted at a Community level.

Minister Colombo also agrees on this and in his opinion "it is necessary to define a crash program to help the aeronautical sector. Also because—he continued, replying to AIR PRESS—the United States are "arming" themselves for the conversion of their military industry and to lead an attack on European industry." It is also up to Europe "to define and put into effect" alliances and collaborations with the United States as well. "The plan must contain support measures." It is true that the resources are limited, but, in any case, special action is needed for aeronautics.

Italy: Research Minister Supports Aerospace R&D

MI1804150394 Rome AIR PRESS in Italian 28 Mar 94 pp 601-602

[Text] The plan "takes into consideration the demand for research that is coming from the country." Whilst it was being prepared "an effort was made to analyze and identify this demand" and to look for ways in which the national "research system" could respond to it. This is what University and Scientific Research Minister Umberto Colombo said when he presented the three-year research plan (1994-1996) in the press room of Palazzo Chigi on 23 March.

The plan has been prepared by a commission presided over by Dr. Domenico Fazio, director of the general programming and coordinating department of the university and scientific research ministry, and has been published in a 160-page document entitled: "Research and Innovation for Development." The government had presented it to those directly involved on the same day in the morning, as established by the protocol agreed upon between the government and the interested parties last July. After this consultation the plan will be passed to parliament. To be precise, this obligation was established under Article 2 of the same law, No. 168, dated 8 May 1989, that placed the universities under what was then the ministry of scientific and technological research, thereby creating the university and scientific research ministry

(MURST) that we have today. The obligation was established, but was never complied with. The new parliament that will be elected on Sunday and Monday will deal with the plan.

ASI Expenditure Within Budget Limits

Up to now there has been a great deal of dispersion and very little profit from research. Colombo is demanding extremely rigorous criteria for the funding of "targeted research" that only "focuses" on those projects that are important for industry. These intentions are expressed in a three-year plan that turns the traditional approach to programming upside down, from one that was based on proposals coming from the "research system," as was the case before yesterday, to a type of programming that starts from the demand for innovation, that which the minister himself referred to, and that comes from the whole country; from industry, agriculture and services, to the public administration. The fact that research and innovation processes have a global dimension must be kept in mind. Their "globality" integrates them in an international context, particularly within the European Community, whilst taking into consideration the strong points in the Italian economic-production system and the specific national vocations.

Analyzing Italy's position in the competitive world system that is emerging, the minister raised "the strong points" again, and also "the weak points that need to be corrected." Certainly Colombo recognizes the fact that the devaluation of the lira has helped make Italian goods more competitive. However, we cannot continue to rely on the devaluation of our currency, because, in the end, the product itself would be devalued, and this product must aspire to the goal of increased technological competitiveness. This is why "targeted" research interventions have become necessary. The need to increase government R&D spending has been shown as being a total of 11.545 trillion lire for 1994, 13.475 trillion lire for 1995 and 15.675 trillion lire for 1996. The quotas for the Italian Space Agency (ASI) are respectively 800, 900, and 950 billion lire. Colombo said that the expenditure of the ASI "has been kept within the limits indicated in the 1994 budget."

Generally speaking, the plan proposes an increase in the allocation of resources in 1995 and 1996, of a further 1.9 and 2.2 trillion lire. However these increases are only partly planned for in the present budget. Therefore, an additional commitment is called for, and its compatibility with public finances will have to be verified. However, Colombo stated that "research is an investment sector for the country," to the point that, contrary to what happened in the past, the funding of projects considered to deserve the funds will never be less than 50 percent of the sum requested by the applicants. This, the minister explained again, "will be useful in training our researchers to work with the Europeans so that our system will be trained to manage research projects in a responsible way."

The additional commitment requested would increase research expenditure as a percentage of the gross national product from the 1.4 percent of this year to 1.6 percent by the end of 1996. However this percentage is still lower the EC average of 2 percent.

Transport, Defense and Space

The three-year plan deals specifically with various sectors of intervention. These include transport (including aeronautics), defense, and space. MURST will present two major national research programs within the next few weeks. One of these regards machine tools and advanced manufacturing systems, and the other textiles. There is a reason for these preferences, and in particular for that shown to textiles. The plan uses two principal criteria to single out the priority sectors to which attention is to be concentrated. One is the added value contribution to the gross national product. Textiles (including clothing, skins, leather and footwear) is in first place in this respect with 47.912 trillion lire at 1992 values (ISTAT [Central Statistics Institute] figures), while transport (including aeronautics) ranks eighth with 20.882 trillion lire. The other is the balance of trade with foreign countries. Here too, and once again for 1992 and based on ISTAT figures, the first place is held by the textile sector with a positive balance of 22.835 trillion lire, while transport is second last with a negative balance of 10.648 trillion lire. However all this does not exclude aeronautics, or space, and neither does it exclude defense from the sectors that MURST considers to be of major interest. One goal that has been established under the guidance of Umberto Colombo is that of setting up, "together with all those involved in research" as the minister specified, internal commissions to evaluate the situation of specific industrial sectors and to suggest concrete remedies. One of these commissions will deal specifically with aeronautics.

This commission, which will have the precise task of working out a national plan for aeronautical research, was already talked about at a 9 February meeting between Colombo and the heads of the AIA (Association of Aerospace Industries). What point have we reached? "The commission on the aeronautical industry that we are setting up will hold its first meeting on 18 April," Minister Colombo said to AIR PRESS. In his opinion "our aeronautical industry has some important strong points," but it is also "weak in the face of a Europe in which 'processes to set up research alliances and consortiums are in progress.'" The "aerospace and defense sector (Alenia, Agusta)" is, according to the plan, one of those affected by the research crisis in 1993. It is one of the "orphan centers," to use an expression from the same document that, on page 104 states that the research crisis in centers that are important "because of their number, size, high scientific level and high competence in key sectors" assumes "an importance that is much more serious than the mere employment issue."

The CIRA [Italian Aerospace Research Center] was also discussed on 9 February at the meeting that the minister and the AIA had with the latter. CIRA had requested that the aerospace research center become fully operational using the funds allocated under Law No. 184/89 and No. 46/91 to define and carry out the national aerospace research program (PRORA) that had been allocated 600 billion lire under the law. So "together with industry we are planning to make an investment of 600 billion just for the aeronautical industry," specified Colombo, who stressed the term "aeronautics" meaning that the commitment of the MURST commission was in this direction and

not focused on the "aerospace" sector, the specific sector that includes what is in other words properly called space. The minister explained that in this way CIRA, which will carry out PRORA, will do so in a way that is fully complementary with the research that has been done up to now in the North. However, the activities of the CIRA itself must go beyond the borders, because, according to Colombo, Italian aeronautical research activity must be conducted together with Europe and within the field of European strategies.

Defending Ourselves From The American Attack

Why must we do this? Because, the minister repeated to AIR PRESS, "after the fall of the Berlin wall, the massive resources allocated for defense programs in the United States, starting with the strategic defense initiative (SDI), were made available to the aeronautical industry," and particularly to the aircraft industry. "An attack on the Airbus has been launched from the United States and we must defend ourselves from this attack," as Colombo mentioned at the presentation of the fourth EC research plan in Rome.

In the aeronautical field today "competition is getting stronger and stronger," and support for competitiveness can only come from research policy; on the understanding that this policy changes; because, Colombo cautioned, "today's industrial policy is becoming more and more technological."

Italian Ministers On EC Fourth Framework Program

*MI3105105794 Turin MEDIA DUEMILA in Italian
Apr 94 pp 30-31*

[Article by Nicoletta Castagni: "Twenty Trillion Lire for European Research"]

[Text] Rome—The fourth EC framework program, that is to say the strategies, trends, and fields of action that the nations of the Old World agree to share in the last few years of this century to face up to the excessive power of the United States and Japan, was recently presented at a crowded meeting organized by APRE [Agency for the Promotion of European Research].

The funding for the next Community plan will amount to about ECU12 trillion, that is 23 trillion lire. This is practically double the ECU6.6 trillion that were invested in the third framework program. The increased financial commitment derives from two factors. On the one hand there is the necessity to harmonize national policies to stimulate and consolidate the competitive ability of the European Union's industrial system. On the other hand, the commitment derives from the omnicomprehensive character that was conferred on the fourth framework program after Maastricht. It will include all the projects, and will be the scientific support of the major European policies. The program is subdivided into four priority actions:

- programs for research, technological development and presentation;
- cooperation with third world countries and international organizations;

- the diffusion and valorization of the results;
- the training and mobility of researchers.

The largest part of the funding, ECU10.536 billion, is destined to go to the research programs (20 trillion lire, equal to 87.8 percent). DGXII Director General Paolo Fasella pointed out that when the resources for the first action were divided up between the various areas of research, the lion's share went to the large and differentiated information technology sector. About ECU3.5 trillion, representing 28.2 percent of the funding, will be allocated for this. Research for the development of new industrial systems will be allocated 16 percent of the funding, 9 percent will go to environmental problems, 19 percent to energy, 13 percent to life sciences and technologies, and 2 percent to transport.

There has been a very high increase in resources allocated for research in the sectors that are strategic for the economy. This ranges from 34 percent for information and communications technologies, to 83 percent for the environment, and 134 percent for life sciences. Transport and targeted social-economic research were not included in previous plans. They have been newly created in order to make more complete the European commitment to reacquiring competitiveness, which is experiencing a strong crisis caused by increasingly tougher competition from the United States and Japan.

A total of ECU420 million have been set aside for cooperation with other countries. In fact, the second action provides for promoting the integration of the central and eastern European countries, as well as of the developing countries. The international initiative will also be extended to the EFTA [European Free Trade Association] nations (Finland, Norway, Sweden, Switzerland, Austria and Liechtenstein) and to initiatives and organisms like EUREKA [European Research Coordination Agency], CERN [European Nuclear Research Center], ESA [European Space Agency], and COST [Cooperation in Scientific and Technical Research].

A total of ECU300 million will be allocated for the third action: the diffusion and valorization of the results. This has the very important goal of maximizing the economic influence of research activities and favoring increased access to scientific and technological know-how for small and medium-sized companies. Finally, ECU744 million will support the fourth action, which is indispensable for giving vitality to the fourth plan, and ensuring that it will have spin-offs. In fact this action deals with the coordination of the training activities within the specific research programs, and reinforcing the networks that connect research centers and laboratories.

At the beginning of the meeting, Universities and Scientific Research Minister Umberto Colombo and European Commission Vice President Antonio Ruberti both expressed their approval of this large investment in scientific and technological research and the actions into which the plan has been divided. According to Colombo there is sufficient culture in Europe to create new interdisciplinary topics that would be capable of strengthening the individual fields of research, and there is a level of creativity that perhaps the United States and the land of the rising sun do not possess in equal measure. Furthermore, the

entire Mediterranean area has great capacity for recovery, also in the energy field, as have the countries of eastern Europe, who can find a large growth factor in research. All this, said Colombo, has been fully understood by those who drew up the fourth framework program, and for this reason no opportunity of making up for lost ground has been overlooked in the actions into which it is subdivided.

Italy, added Colombo, has the same problems as the rest of the Community, but unfortunately they are worse. Investment in scientific research is still small, only 1.4 percent of GNP, and the efforts are fragmented and do not follow a single strategy. However, with all its shortcomings Italy has responsibilities as the country that acts as a link between the more advanced nations and those that are less developed, and it could have a very important role to play within the context of the European Union. Besides, in Italy there are, for example, many large high-technology industries. However, this alone cannot make up for the chronic lack of interchange to diffuse technologies to small and medium-sized companies. These have been able to gain more competitiveness on the international markets than the large industries have as a result of a weak lira. However such an advantage is destined to have a short life, because if there is no investment in research they will soon be outclassed again by the foreign competition. Therefore, acquiring an understanding of the real needs of the small and medium-sized companies and the creation of adequate support for the transfer of technologies has become a priority.

In the meantime, the traditional seats of Italian research have grown. As Umberto Colombo pointed out, over 25 years the universities have doubled their centers and the number of students attending them has tripled. Recent regulations have tried to make the courses conducted by the numerous national universities more effective. Furthermore there are the resources of public research bodies like the CNR [National Research Council], ENEA [National Agency for New Technologies, Energy and the Environment], INFN [National Institute for Nuclear Physics] and the space agency, that, as the minister said, must find their role again. They all have a difficult job because investments are below the European average. Before allocating resources to the research sector, said Colombo, it was necessary to think about limiting public expenditure, and before asking for an increase in expenditure, it was necessary to eliminate waste.

However, the allocations can make use of instruments that have already been extensively used, such as the national projects for the universities, in which new management models and mechanisms of evaluation of a European type have been introduced. Then there are the targeted projects of the CNR, the IMI [Italian Institute for Financial Real and Personal Property] foundation, and the national programs. Above all, however, the access of small and medium-sized companies to technological innovation must be made easier. This is the thorny issue that Minister Colombo returned to several times, indicating that a solution could be an intervention policy across the territory. For this reason, 13 science parks are being set up in the south of Italy, which is ever more penalized, and new ones will be created. The way in which the new structures have been promoted should assure a greater integration

between the world of research and industrial needs that are always dramatically in the limelight, particularly in the south.

For European Commission Vice President Antonio Ruberti, the fourth framework program is also important because it tests the Council's unanimity mechanism for the first time. This should assure that actions are more efficient from now on. It is a factor that should be given prime consideration, because competitiveness depends mainly on timing and on agreements for initiatives. In fact, it only took 14 months to get the new research program ready, and an agreement was reached on the decidedly increased funding much more quickly than it had been for the preceding programs.

For Ruberti, it was important to find mechanisms of this type as the entire planet is involved in major transformations. There is certainly a strong acceleration in geopolitical arrangements and we are currently witnessing space collaboration between the United States and Russia which, only a few years ago, would have seemed to be science fiction. These two countries, that have been in perennial strife for political and technological supremacy for more than half a century, are now in a period of peace and are turning the enormous investments they had made in defense almost entirely over to the civilian sector. Naturally all this will have effects that are also relevant for Europe. As the amount of competition increases, it concentrates, and it could move the Old World out into the suburbs, even more than it is doing now.

Another factor of transformation that can be identified is the profoundly changing relationship between research and innovation, said Ruberti. In fact, until a few years ago, there was certainly a direct and linear relationship between these two components. Instead the world recession has highlighted contradictions and difficulties, a complexity that is often ignored. Unemployment has been the most dramatic effect of the crisis, and no decisive interventions have been made regarding innovative productive processes because of worries about the jobs that must remain. The level of competitiveness and research are feeling the effects. Companies are investing less, and they are investing in projects that can be realized in the short term. However, basic research is still fundamental for the growth of industry. According to Ruberti we must work together to find a new equilibrium between the two dimensions of research, and this must be done quickly because Japan will allocate 5 percent of its national resources to research at the end of the century.

How could the serious problem of unemployment be resolved? According to Ruberti, the framework program, and the major project that it contains for information superhighways, constitute an important step. The preparation of an extensive and complex telecommunications infrastructure, on a level with the United States, will be able to activate many mechanisms that could lead to new types of research, new jobs, and a renewed commitment to participate and invest on the part of the companies. The perspective is that of an enviable market that calls for services and systems that will guarantee a high quality of life and nonstop competitiveness.

Netherlands: Andriessen Outlines Future Biotech Policy

BR0905124594 *The Hague EKONOMISCH ZAKEN in Dutch 7 Apr 94 p 7*

[Unattributed article: "Biotechnology: From Research to Marketplace"]

[Text] Economic Affairs Minister Dr. J.E. Andriessen sent a letter to the [Netherlands] lower house on 28 March 1994 in which he set out his vision for the advancement of biotechnology.

The primary reason for this letter was a question from MP Mrs. Rempt concerning the economic effects of the technology directive. Minister Andriessen promised to give an answer based on experience gained from the biotechnology program. Particular attention was paid to those projects which have been supported within the framework of the Stimulation Program for Industrial Technology (PBTS).

Improvement

It appears from the answer that 54 percent of PBTS projects are directed towards improvement of existing production processes and the development of new ones. In addition, 38 percent is aimed at the improvement of existing products or the development of new ones. About 40 percent of the projects being supported lead to a commercial application within three years. This is in general not a bad result for industrial research, because such research does not automatically result in commercialization. During the previous period (from 1987) there had been a sharp upturn within the PBTS program in the number of companies carrying out biotechnological research (from 30 companies in 1987 to 262 in 1993). Since the start of the PBTS biotechnology program, 314 projects have been supported originating from 262 different companies. In 85 percent of the projects there has been collaboration amongst companies or between companies and the scientific world.

Note

In the Note "From Research to the Marketplace" which accompanied the letter, Minister Andriessen indicated what outlines the policy for the stimulation of biotechnology will take over the coming four years:

1. Securing the existing networks between the scientific world and companies involved in biotechnology. This is, among other matters, included in the plans of the Association of Biotechnological Research Schools in the Netherlands [ABON]. Through ABON, university research capacity is secured and the industrial direction of the work program given shape. Over the coming five years, the government (the ministries of Economic Affairs, Agriculture and Fisheries, and Education and Science) and the Dutch Organization for Scientific Research (NWO) have promised 22 million Dutch guilders. Additionally, 25 million guilders will be invested via the ICES [Interdepartmental Commission for Economic Structural Policy] for scientific development over the coming years in the field of biological ground improvements "in situ" (NOBIS) [Netherlands research program for biotechnological on-site cleaning] and possibly another 20 million guilders in the near future for equipment to be used in research carried

out by the research schools MIBITON. Both of these projects will be set up in close consultation with the appropriate business sectors, from whom a substantial contribution will also be requested.

2. Maintaining the involvement of the total Netherlands participation in European research programs for life sciences at the present level. Netherlands companies and research institutions will be encouraged to participate to the maximum in the European Union's Fourth Framework Program for Research by means of lateral policies.

3. Broadening of the industrial basis and strengthening of the relationship between companies and scientific institutions. Considering the potential of companies (1,500 according to the study carried out by TNO/STB) [Netherlands Organization for Applied Scientific Research/Research Center for Technology and Policy] where biotechnology can contribute significantly to the broadening of the industrial basis and the positive effect of the PBTS program, it is intended over the coming four years to continue the company-oriented stimulation of technology in the same way.

4. Stimulation of constructive consultation between producers of biotechnological products and relevant social organizations. The government has a facilitating role to play here. Activities will in the first instance be directed towards a dialog between the business world, consumer organizations, and other relevant social groups. Resulting from this dialog, the various organizations can set up information activities and other public relations exercises for the individual consumer.

5. In cooperation with the appropriate ministries, working on a clear acceptance policy for new biotechnology products. For the responsible introduction of new biotechnology products and processes, it is of very great importance to have control over the results of expert and generally accepted safety research. In view of this, special demonstration projects per product or product group will be supported within the program.

To cover the realization of this program, an annual amount of 23.5 million guilders has been set aside in the Ministry's budget for the period 1994 to 1997. As regards budgetary scale, this boils down to continuation of the current Economic Affairs program for biotechnology. It is exclusive of the contribution from the European Union and from other departments, and of special projects which are supported, for instance, by ICES funds.

Netherlands: Research Into Innovative Software Subsidized

BR1606105194 Amsterdam COMPUTABLE in Dutch
13 May 94 p 3

[Unattributed article: "Law for the Encouragement of Work in R&D To Provide More Scope for Innovative Applications"]

[Text] The Hague—The Ministry of Economic Affairs is still trying to meet the urgent request of some 140 software producers for the reversal of the effective neglect of software in the Law for the Encouragement of Work in R&D (WBSO). The regulation putting the law into force, which appeared last week in the Official Gazette, leaves more

scope for innovative software companies than might have been expected on the basis of the concept implementation regulation.

To be eligible for this labor costs subsidy there must be research into or development of systems or software, aimed at technically new applications in physical products or production processes. The criteria would also be satisfied if it produces a technically new effect. Here, the word "computers" could possibly be understood in place of physical products or production processes. Just as suitable for subsidy are applications which ensure that a physical product (or hardware) reacts in another way in a technical sense within its own environment. Examples are image recognition, digital signal processing, geographic information systems, CAD/CAM [computer-assisted design/computer-assisted manufacturing], CIM (computer-integrated manufacturing), etc.

Not included are software modifications in a computer, resulting only in new, and therefore different, data. Technological originality must always be the most important element. The development, including maintenance, of applications software, i.e., software for a specific function, without new technological developments, is not considered to be R&D work.

Unclear

The text of the descriptive regulation, which the Ministry of Economic Affairs has produced especially to cover software development, is hardly very clear. Research into and development of software is partially excluded, according to the text of the regulation putting the law into force. It is not, however, the intention that all activities in the area of software should be excluded from the program. Subsidies will be possible, especially if the software is specifically aimed at research work or at the control of a technically new physical product. The definitive subsidy percentage for 1994 has not yet been decided upon. Only after the period for submission has elapsed—it comes to an end on 9 June—will the total number of claims be counted. This total will then be divided by the available amount—for 1994 it is 210 million [Dutch] guilders—after which the percentages will be published at the beginning of July.

An attempt will be made to arrive at 25 percent (the maximum is 32.5 percent) on the first 100,000 guilders in labor costs and 12.5 percent (maximum 20 percent) above that.

CORPORATE ALLIANCES

France: Aerospatiale, SAFT To Cooperate on Thermal Batteries

BR0206082794 Paris LE BULLETIN DU GIFAS
in English 21 Apr 94 pp 1-3

[Unattributed article: "Aerospatiale Batteries: A European Giant is Born"]

[Text] Aerospatiale Batteries (ASB) is a joint subsidiary of Aerospatiale (71.8 percent) and SAFT (28.2 percent). The recently formed company has the legal status, under French law, of a Societe Anonyme (SA), approximately equivalent to a public limited liability company under British law, with an authorized capital of 33,750 million

French francs [Fr]. The company's main activity is the design, development, production and marketing of thermal batteries.

ASB owes its existence to a know-how alliance bringing together SAFT's knowledge of electrochemistry and the experience of Aerospatiale-Missiles in the production and use of thermal batteries.

Thermal Batteries

A thermal battery is an electrochemical cell in which the electrolyte is an inert solid at ambient temperatures, but a true electrolyte after it has been heated to a high temperature by a chemical reaction.

Thermal batteries are an essential component of a large range of military hardware requiring an autonomous source of electrical energy. They are particularly important as a source of in-flight power for tactical missiles.

Contrary to other battery types, which discharge slowly even when not in use, thermal batteries deliver energy on command, when required. The one drawback is that they are "one-shot" devices. Different types offer endurance from 3 seconds to 30 minutes, output voltages from 2 to 200 V, and power ratings from 1 to 1000 watts.

The basic concept was invented in Germany in the '40s to provide electrical energy for the infamous V2 rocket, then reappeared in the United States in the '60s. Even today, only a handful of countries have the technology to produce thermal batteries. To date, these devices have been used almost exclusively by the aerospace and defense industries.

Modern thermal batteries feature miniaturized designs and endurance extending to almost 30 minutes. As their capabilities grow, so the range of applications has grown. Today, it extends to smart munitions and submunitions including guided bombs and shells.

Other developments are leading to further applications in the aircraft industry (electrical power for ejection seats), space, and security systems. There are also good prospects for civil applications, beginning with automatic triggering devices and backup electrical power.

The advantages of thermal batteries are undeniable: near-instantaneous start-up, long shelf life (over 20 years) without loss of energy (and without maintenance or servicing), capability to withstand the most severe environmental conditions including intense shock, and no harmful effects on the environment.

Thermal Battery Production in France

The Aerospatiale-Missiles Division set up a plant in the late '60s to supply batteries for its anti-tank missiles. The Division has produced over 700,000 batteries since 1967. No manufacturer anywhere in the world has implemented high-volume production engineering on a scale comparable to that of the Aerospatiale-Missiles Division.

ASB, European Leader in Thermal Batteries

With forecast sales in the vicinity of Fr80 million per year, ASB will be Europe's leading producer, and the second largest in the world.

ASB's short-term goal is to win two-thirds of the European market (evaluated at Fr150 million) and gain a foothold on the U.S. market which is dominated by a single manufacturer.

In Europe, ASB plans to consolidate its dominant position, particularly in the fast-expanding market for smart munitions. The company has the resources to meet the needs of programs currently at the development stage, notably the French-Swedish Bonus missile.

ASB plans to invest some Fr20 million during 1993-1994 to meet workload commitments. This will cover expanding the production area and recruiting 30 new members of staff in 1994.

Based at Bourges in central France, ASB was recently awarded a contract by the Aerospatiale Space & Defense Division to develop a new thermal battery to power a system for the Ariane 5 launcher to avoid any risk of collision between the launcher proper and its boosters immediately following booster separation.

Aerospatiale Batteries supplies thermal batteries to Matra, Thomson and Aerospatiale. It hopes to win new clients among the customers of French tank and weapon maker GIAT Industries for smart munitions currently under development.

France: Thomson-CSF, Bertin Join Fiber Optic Sensors Research

94WS0378B Paris INDUSTRIES & TECHNIQUES
in French May 94 p 30

[Article by Yves Ciantar: "Thomson-CSF Partnership with Bertin in Fiber Optics"]

[Text] The two French firms are establishing a hub of expertise in the field of fiber-optic sensors. Thomson will exploit spinoffs in the military domain. And Bertin will apply these technologies in the civilian sector.

On 21 March 1994, Thomson-CSF and contract research firm Bertin signed a collaboration accord in fiber-optic sensors. Under the agreement, the two firms will pool their know-how. Bertin will exploit the fruits of this collaboration in the civilian domain, Thomson-CSF in military applications. A coordination committee will monitor the accord's implementation. On the personnel side, the accord will mean transferring the six-person optics team at the Thomson-Corbeville central research laboratory to Bertin's facility in Aix-en-Provence. On the technology side, Thomson-CSF and Bertin have agreed to a 5-year reciprocal license transfer.

It has been 15 years since people began talking of the alluring potential of fiber-optic sensors. With laser light's utility both as a measurement principle and an information vector, fiber-optic sensors are immune to external electromagnetic perturbations and can function in challenging environments, for example under chemical attack. The absence of electric current in these sensors enables them to operate in zones where explosives are present. Finally, they are not physically bulky.

Conclusion of the accord should help the two partners boost their respective sales volumes. "For Bertin, fiber optic activity already accounts for 15 million French

francs [Fr] of its turnover," says Bertin's Pierre Ollion. "With this accord, we hope to see that figure increase 20 percent per year." At Thomson, which did not wish to discuss its sales figures, management predicts growth of 20 to 25 percent per year. In civilian applications, Bertin has already installed 30 fiber-optic colorimeters for oil-industry clients. With Thomson's technologies—"especially those bearing on strain gauges," notes Ollion—Bertin hopes to increase the market for safety-monitoring equipment for some 200 bridges built each year in France. "Fiber optics will be buried in the concrete components of bridges," Ollion continues. "They will provide data on deformations. Such systems will complement visual inspections carried out by technicians."

In the military sphere, Thomson-CSF expects to expand in two major fields: submarine detection, where tomorrow's acoustic sensors (acoustic streamers, to submariners) will employ fiber optics; and manufacture of "intelligent" composite materials. Fiber optics will also be employed in future aircraft, buried within their structures, to provide real-time data on airframe deformations.

The Technologies

There exist two sorts of fiber optic sensors. Some employ the fiber directly as a sensor. External physical pressure induces deformations in the optical fiber. The deformations modify the quality of light traversing it. In some sensors, polarization changes under the influence of external pressure. From a technological standpoint, these sensors are the most difficult to develop.

In other sensors, the optical fiber serves "only" to transport light from another sensor element. Bertin has developed an "all-or-nothing" temperature sensor that uses wax. A beam of light is focused on the wax. The wax melts at a given temperature. Once melted, it transmits the light it receives, after a long passage in an irradiated optical fiber, [to] a photoelectric cell.

France: Bosche's JS Telecom To Buy Teprina

94WS0369C Paris L'USINE NOUVELLE in French
12 May 94 p 32

[Article by Jean-Pierre Jolivet: "JS Telecom Strengthens Position in Exchange Installation"—first paragraph is L'USINE NOUVELLE introduction]

[Text] The Bosche subsidiary's reorganization also entails augmenting service activities.

The French PAX [private automatic exchange] manufacturer, a subsidiary of the Bosche group, will soon acquire Teprina, one of the largest independent telephone equipment installers. Teprina, which employs 280 people, specializes in enterprise networks and building wiring. With a distribution network of 10 regional branch offices, its sales volume for 1993 was 116 million French francs [Fr].

Distribution Network

The new acquisition—following its takeovers of Sarrazin, Midi Technique, and Centratel—consolidates JS Telecom's position as number four in the French telephone exchange installation market. It expects sales to top the Fr600 million mark in 1994. "We will have a network of branch offices with 780 employees covering the whole

country. That's indispensable in the small- and medium-capacity exchange niche where we're concentrating our effort," explains JS Telecom's president, Yvon Le Bars.

JS Telecom hopes that by acquiring a larger share of the installation market, it will emerge from the current sectoral shake-up as one of the front-runners. Alcatel has put all its installation activities (Telic, GST, Opus) under the umbrella of a single subsidiary, Alcatel Enterprise Networks. Matra Communication Distribution has a network of branch offices that provide very good coverage for the whole country. More importantly, France Telecom, which just last February took over Sogestel (France's biggest independent exchange installer), after acquiring Cofratel in 1992, is still hungry for expansion. With so much concentration in the sector, opportunities are becoming increasingly rare.

Like other producers of private automatic exchanges, JS Telecom sees installation as an indispensable complement to its manufacturing activity. First, because services are providing an increasingly large portion of value-added. Installation of telephone exchanges has evolved into network engineering. In the future, it will be an integral part of "facilities management." Second, manufacturers in the private telephone field are facing a domestic market that has been shrinking for several years now under the dual impact of recession and steadily dropping line prices, which have declined 25 percent in 2 years!

This decline dealt a painful blow to JS Telecom at a time when it was deep in the throes of reorganization, right after its acquisition by Bosche. Its 1993 turnover of Fr756 million represented a 7-percent drop, and once again it posted a loss for the year. With 130,000 lines sold in France, JS Telecom has an 8-percent share of the market, compared to a 15-percent share just 5 years ago.

As part of a major restructuring of its industrial plant, JS Telecom relocated all its manufacturing activities to the new Montceau-les-Mines facility. It abandoned its remote-control niche in 1992, then gave up its office automation activities (Jistral) in early 1993.

These moves enabled JS Telecom, which today employs 1,050 people, to concentrate more on its primary domain, private telephony, and to recapture the initiative, especially in the lucrative services domain.

[box, p 32]

JS Telecom is moving into the ranks of the "heavy hitters." Turnover for the leading private telephone exchange installers in the French market is as follows: Alcatel Enterprise Networks, Fr5,000 million; Matra Communication Distribution, Fr1,500 million; France Telecom (Cofratel, Sogestel), Fr970 million; and JS Telecom (with Teprina), Fr620 million. [end box]

CORPORATE STRATEGIES

France: SAGEM Financial Report, Activities Outlined

BR0106100194 Paris LA LETTRE DU GIEAS
in English 13 Apr 94 p 2

[Unattributed article: "SAGEM: Financial Report and Activities"]

[Text] SAGEM [Company for General Electricity and Mechanics Applications], SAT [Telecommunications Corporations] and SILEC [Electrical Link Manufacturing Company] together form the SAGEM Group, a high tech French group which in 1993 posted a turnover of 13 billion French francs [Fr] (\$2.3 billion) with a staff of 14,600 persons. The Group holds leading positions on the international scene in three major fields:

- Communications and terminals, where SAGEM is one of the leading European firms in telefax, radio-telephone systems, telephone network and switching equipment;
- Electronics, cables and industry equipment, with particular SAGEM expertise in automotive equipment, pay and television terminals;
- Navigation, electro-optics and defence, where SAGEM is Europe's leading manufacturer of inertial navigation and guidance system and SAT of infra red systems.

Total consolidated net revenue was Fr534.5 billion and the Group share was Fr423.414 billion, a growth of 15.6 percent. Consolidated Group accounts for 1993 indicate an auto-financing capacity of Fr1,281 million, which more than covers industrial and financial investments which for the same period amounted to Fr884 million. Consequently, holdings are in a positive state (real estate, investments and available cash flow, not including agio returns nearly at maturity). The improvement from Fr1.9 billion as of 31 December 1992 to Fr2.4 billion on 31 December 1993 is significant.

With a staff of 5,700 persons, SAGEM posted a turnover of Fr5.6 billion (\$1 billion) in 1993, with Fr2.10 billion (\$385 million) for the Navigation and Defence Division.

In the defence field, SAGEM focuses on several key sectors:

- Inertial navigation, guidance and stabilization systems for all sea, ground, air and space applications, using the latest technologies such as tuned-rotor, ring-laser, fiber-optics and electrostatic suspension gyroscopes;
- Aircraft avionics upgrade to state-of-the-art operation performance;
- Digital mapping systems and associated applications, ranging from mission planning to tactical situation display;
- Day/night sighting systems, electro-optical tracking sensors and systems for aircraft, armored vehicles, field artillery and surface ships;
- GPS receivers, INS/GPS integration and ranging systems;
- Periscopes, optronic masts and steering stations for submarines.

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France: Rhone-Poulenc Strategies for Competitiveness

Biotech Genetic Engineering Division Created

94WE0368A Paris L'USINE NOUVELLE in French
5 May 94 p 27

[Article by Pierre Laperrouzaz: "Rhone-Poulenc Rorer Converts to Gene Therapy"]

[Text] *Rhone-Poulenc Rorer intends to become one of the three world leaders in the field of gene and cellular therapy by year 2000.*

Rhone-Poulenc Rorer is banking on gene therapy to power its climb toward a place among the world's top-ranking firms in pharmacology. The group, with a 1993 revenue of 22.6 billion French francs [Fr], ranks only 14th on the world market. And except for Taxotere, a very promising anti-cancer drug that it expects to launch this year, it cannot count on its activities at the molecular level to generate the thrust it will need to achieve its goal in the very near term. "Gene therapy can make the difference, because all the laboratories find themselves at the same starting line," says Thierry de Soursac, deputy general manager of Rhone-Poulenc Rorer and head of its new Biotech Division, created specifically to coordinate the group's gene therapy activities.

The group is not lacking in strong cards needed to enter this 21st-century field of medicine, which consists of repairing the defective genes that are responsible for many diseases. Its cards include its own in-house capabilities as well as the joint ventures and alliances it has developed on the outside.

Its most recent operation was the acquisition, in 1993, of a 38-percent capital stake, for \$115 million, in Applied Immuno Sciences [AIS], a California-based company specializing in cellular therapy. This technology consists of extracting the cells involved in a disease (blood cells, marrow cells, etc.), multiplying them, and activating them *ex vivo*, then reinjecting them into the patient. This technology will be an invaluable aid in introducing "repair" genes into target cells. It was used for the first time in 1990 in the case of a young girl suffering from an enzymatic deficiency.

While Rhone-Poulenc Rorer has no intention whatever of giving up investing in research and development in chemical pharmacology, gene therapy will become a priority. The group already devotes between 10 and 12 percent of its \$560 million R&D budget to gene therapy. This undertaking is largely owing to the efforts of Professor Claude Helene, a DNA specialist and the group's scientific director since 1990. "Five years ago," says Jean-Rene Fourtou, the group's CEO, "I would never have thought that we would be putting so much money into the biotechnologies." But the game is worth the candle. Gene therapy will enable the treatment not only of hereditary diseases but also of numerous acquired diseases—cancer, Alzheimer's, atherosclerosis, and AIDS, for example—by using modified cells as attack vehicles.

\$40 Billion in 2010!

The potential is immense. According to the American consultant POV, the cellular therapy market will total between \$3 and \$6 billion by year 2000, and the gene therapy market \$40 billion by year 2010! For the moment, very few of the big groups have committed themselves to these markets as resolutely as has Rhone-Poulenc Rorer, except for Sandoz and Boehringer Mannheim—through one of its subsidiaries, which has signed an agreement with Seattle-based Cell Pro Inc.

"Our objective is to become one of the three world leaders in this field between now and year 2000," says Thierry de Soursac. Rhone-Poulenc Rorer will market gene therapy products in vivo through the same networks as its other prescription drugs. They will be injectable and will contain a DNA vector.

Its second "distribution" network will consist of gene and cellular therapy centers, where the patient's cells will be treated. To this end, the group has formed a joint venture with AIS for the purpose of setting up a worldwide network of centers.

AIS already operates two such centers on an experimental basis, in San Francisco and Los Angeles, for the treatment of AIDS. Lymphocytes extracted from the blood of the patient are multiplied under the action of a growth factor, then reinserted. A similar treatment is currently being tested for certain forms of cancer of the kidney.

[Box]:

Rhone-Poulenc Rorer's Cards

- Access to the genetic sequences: agreements with gene banks, including Genethon.
- Its know-how in genetic engineering and molecular biology: Institut de Vitry, Pasteur Merieux Connaught.
- Its know-how concerning the use of viral vectors to introduce foreign DNA into a cell: joint laboratory with the Institut Gustave-Roussy at Villejuif, and agreements with Virogenetics in the United States.
- Its know-how in the field of nonviral vectors (liposomes): collaboration with the University of Strasbourg.
- Its ex-vivo cellular therapy know-how: acquisition of a 38-percent capital stake in U.S.-based AIS.

Waste Disposal Alliance With Boyer

94WS0368B Paris L'USINE NOUVELLE in French
5 May 94 p 79

[Article by Christian Guyard: "SRN Recycling Polyamide Waste"]

[Text] Rhone-Poulenc has formed an alliance with a PMI [Small and Medium-Sized Industry] firm, Boyer S.A., a Lyon-based PME [Small and Medium-Sized Business] firm specializing in the treatment of polymer wastes, to recycle its production waste. Tests on pieces that have reached the end of their useful life are planned.

SRN [Nylon Recycling Company], the company born of this alliance, and based in Lyon, has been recycling polyamide 66 since mid-February. The new company has an installed capacity of 1,000 tons a year, and treats the waste

generated by production accidents in Rhone-Poulenc's polymerization and spinning units.

Previously, Boyer S.A.—30 full-time employees, and a 1992 revenue of Fr20 million—had limited its activity to the sorting and repulverizing of thermoplastic canes and bulk pieces, sometimes weighing several kilograms, discarded by production shops. Boyer S.A. was founded in 1979. It processes approximately 1,500 tons of polyester a year and some 3,500 tons of polyamide 66, for two principal markets: "Textile" applications, in which residues consist of fibers, which, after cutting up, serve as stuffing material; and "plastic" applications, in which the material is remelted and regranulated for industrial applications. The characteristics of the regenerated material are less regular than those of a choice raw material, but they are more than adequate for many applications.

With the new installation, Boyer S.A., instead of selling its plastic waste to regeneration specialists, will now process it on its own. The installation will consist mainly of a single-screw extruder with an output capability of 300 kg per hour. The extruder produces canes that are then granulated and pulverized by a crusher. But the recycling process requires a reformulation of the material to obtain granules of a given color—most often, black—and a specified load per unit area. The raw material for this installation consists of the sorted and crushed scrap furnished by the shredder and crushers of a neighboring Boyer workshop. This scrap is divided into homogeneous 6-ton lots, and the proportions of the components in each lot (glass fiber and talc) are determined on the basis of samples weighing around 10 kg each. This determination having been made, the mixture ratio of the charge to be introduced to attain the desired quality is then calculated.

Production Capacity Nearing Saturation

The upstream side of the extruder is the most complex part of the unit. That is where the mixing of the components, five in number, takes place. The glass fiber is delivered cut up into 4-mm lengths, in cartons. The fiber is crumpled and titrated before being sent into the homogenization hopper at the input to the extruder. This hopper also receives the granulated material to be regenerated, a pulverulent mineral charge (talc), and, as the case may be, textile waste that thus acquires a higher market value than as stuffing. All proportioning is by volume. The desired color is obtained by means of a black masterbatch. If the material to be regenerated is not tarnished, it is possible to produce a "natural" tint. The output of the extruder is conventional, with cooling of the canes, granulation, pouring into 25-kg bags or 500-kg or 1-ton cartons. The extruder is Italian-made (Prealpina), and proportioning equipment is supplied by Equiptec. The installation was designed jointly by Boyer and Rhone-Poulenc, and the investment totals Fr3.5 million.

SRN expects to rapidly attain an annual revenue of Fr7 to Fr8 million. The material is sold at a price of Fr10 to Fr12 a kilogram. But if one considers the tonnage of polyamide processed by Boyer, the production capacity of the installation could very soon be saturated. This is all the more likely considering that recycling tests are to be conducted on other sources of recovered materials, such as discarded automobile parts.

[Box]:

Keep the Value Added in France

The Boyer company crushes and sorts the downstream waste products of polymerization production processes.

The clean crushed scrap is delivered to regenerators, mainly foreign ones since the company derives three fourths of its revenue from exports, mostly to Italy. Most of the value added in the recycling process takes place in the final phase of the operation: the remelting and granulation. Another given of the problem is that Boyer processes only the waste products generated by different units of the Rhone-Poulenc group. The two companies therefore created SRN around the beginning of 1994.

Boyer will improve its profitability and broaden its portfolio of activities, and Rhone-Poulenc will gain better control of and develop the recycling of its own waste products. The recycled product will be sold under the name Fabelnyl RC by the Rhone-Poulenc network, and eventually by Nyltech, a joint venture with Caffaro.

France: Bull CEO Quizzed on Privatization

BR2706095894 Paris LA TRIBUNE DES FOSSES
in French 25 May 94 p 7

[Interview with Bull Chairman Jean-Marie Descarpentries by Marc Nexon, Valerie Petit; place, date not given: "Bull Will Remain As It Is"]

[Text]

[LA TRIBUNE DES FOSSES] Are you planning on changing the direction of Bull's strategy?

[Descarpentries] All the strategic decisions made by my predecessors have proven to be very good, without exception. Our entry into the microcomputing market was essential. This business has many advantages for us. It forces us to act quickly, establish new distribution circuits, and considerably improve our cost prices. The sale of Zenith Data Systems, which is recovering rapidly, is not on the agenda. On the contrary, the pc spirit should spread throughout the group. Other strategic choices made before my arrival that have paid off include the adoption of IBM's Power pc technology and the partnership with Packard Bell. Lastly, the wisdom of our presence in the United States cannot be questioned, since most innovation begins there. Europe still lags behind, both where software and hardware is concerned. There are two diagnoses for an ailing company: Either—and this was the case for Bull—the strategy is good but the organization and the implementation of decisions are ineffective, or the reverse is true. In fact, we have been extraordinarily lucky, since it is simpler to correct management problems than the wrong technological choices or strategies. If I had had to redefine Bull's strategy, it would have taken several years.

[LA TRIBUNE DES FOSSES] Will Bull's recovery last?

[Descarpentries] Yes. I am convinced that Bull's falling revenue is not an unavoidable phenomenon. The proof of this is that today the curve has reversed: Sales were up 20 percent in the first four months of the year, and the trend is continuing. Last year, invoicing in the mainframe and maintenance divisions fell by 15 to 20 percent. Now we

have limited this drop to just 5 to 6 percent. As for Zenith, it has moved up from last year's 16th place in the U.S. ranking of pc manufacturers, to occupy eighth place in March. In this context, I will be happy if Bull's turnover is up 10 percent by the end of 1994. In any event, by the end of April, all our activities posted increased profits and reduced their deficits. Thanks to cutting non-wage costs and increasing growth, the group has managed to cut net losses by 1 billion French francs [Fr] compared with the same period last year [Fr 3.4-billion annual net deficit last year before restructuring payments—LA TRIBUNE DES FOSSES editor's note].

[LA TRIBUNE DES FOSSES] Is this bright patch not simply linked to the unblocking of orders?

[Descarpentries] Absolutely not. Once Bull's strengths and weaknesses had been identified the group was brought back on line. Some 10 new senior managers were appointed and 100 managers were assigned responsibility for their activity and asked to submit monthly progress reports. Previously, there was no way of measuring the intrinsic performance of each activity.

[LA TRIBUNE DES FOSSES] When will you start making a profit again?

[Descarpentries] The results of 1994 will be another step towards the essential aim of recovering and becoming viable again by the end of 1995. The net result in 1995 will be balanced or even profitable. Such a recovery would have been possible in one year, but then you would have had to accept a new round of staff cuts and the discontinuation of activities that were no longer profitable. For me there is no question of another global social plan and I would rule out shedding any of Bull's main activities (corporate servers, open systems, pc's, systems and services integration, management facilities, maintenance, etc.). The group will remain as it is and in this way we will ensure that it is viable. However, sub-activities could be transferred elsewhere—I can think of two of the current 23. The decision on whether to sell them off or shore them up with partners will be taken in July.

[LA TRIBUNE DES FOSSES] What is your partnership policy?

[Descarpentries] It is different for each activity and must first and foremost be based on industrial, commercial, and technological agreements. A capital partnership may then come in a second stage. For example, the agreement we signed two years ago with IBM, which combined both financial and industrial aspects, would not be negotiated in the same way today. We are in the process of finalizing five industrial projects, mostly with American companies of all sizes. However, these partnerships will not replace our current allies of NEC, IBM, France Telecom, and Packard Bell. That does not mean, though, that we cannot enter into discussions with other European groups. Consequently, we are currently examining five projects with the British group ICL.

[LA TRIBUNE DES FOSSES] How far have you got in your discussions with NEC and IBM?

[Descarpentries] We have not really talked about the privatization issue with them. Our discussions are still centered around the industrial side of things. Thus, with

IBM we are planning to launch a mini system nicknamed Pegasus, the hardware part of which is 80-percent Bull-developed and based on its multiprocessor technology. With NEC, negotiations are also focusing on mainframes. We are hoping to market our GCOS 7 in Japan through NEC. NEC's chairman recently told me: "Everything that is good for Bull is good for us."

On the financial level, NEC has said it will decide whether or not to increase its stake in Bull by the end of the year. IBM did not participate in Bull's last capital injection, but given the first signs of recovery, it is not impossible that it might change its mind.

[LA TRIBUNE DES FOSSES] How is the Bull privatization going to be implemented?

[Descarpentries] We have taken on two banking advisers, Indosuez and Warburg, both charged with setting up the privatization. We have chosen a foreign bank to simplify the search for American partners. Last October, there were two possible privatization scenarios: Either we could watch a hostile takeover bid leading to the dismantling of the company, or we could establish a hard core holding 30 percent of the capital. I prefer this second solution. Bull's recovery has made this possible and now gives us the ability to choose our future shareholders. Initially, I had only envisaged the presence of industrial groups in this hard core, but today I am also thinking of long term financial investors. Some are already interested. Their arrival would have the advantage of accelerating the privatization process. The arrival of a first partner will then enable us to open up the capital to group employees: 10 percent initially, and then 20 percent after a year.

[LA TRIBUNE DES FOSSES] Do you propose opening up the capital of your various subsidiaries at the same time?

[Descarpentries] Of course. All our activities are liable to accept partners, all the more so since our partners want above all to establish capital ties with our different activities before they think about taking a stake in the parent company. Partnerships like this are being studied for the UNIX systems integration divisions. We could also envisage opening up the capital of our regional authorities. As a result, Bull Great Britain could invite its staff to take a shareholding.

[LA TRIBUNE DES FOSSES] What about Zenith Data Systems?

[Descarpentries] Nothing has been decided on, but in addition to Packard Bell this subsidiary could link up with another partner to develop its server business.

[LA TRIBUNE DES FOSSES] What efforts must be continued?

[Descarpentries] We must further accelerate the reduction in fixed, non-wage costs. We also have to improve the monitoring of our purchases and, lastly, make a special effort to bring our productivity levels on a par with the best in the profession. We are still 24 percent behind our best competitors. We will close this gap in three or four years. However, there will never be any more global social plans. The Pache plan, which is now drawing to a close (6,600 planned redundancies throughout the group) is the last

global approach of this kind. Our aim is clear: Bull must become the leading European supplier of information systems by the year 2000.

France: Turbomeca Personnel Reductions Announced

94WS0373B Paris LE MONDE in French 27 May 94 p 22

[Article by correspondent in Pau, Jean-Michel Guillot: "As a Result of Stagnating Helicopter Sales, Turbomeca Eliminates 450 Jobs"]

[Text] On Thursday, 25 May, at a meeting of Turbomeca's enterprise central committee held in Bordes (Pyrenees-Atlantiques), the top management made public its plan to adapt production to the prospects of the world market for gas turbines under 3,000 hp. These small and intermediate-size turbines are produced mostly for helicopters, a market where Turbomeca is the leader but which remains smaller than was projected in the early nineties, the management announced. As a result, Turbomeca—like its American competitors—finds itself forced to adapt its structures and its personnel.

The personnel-reduction program proposed by the management would eliminate 450 jobs. Because 64 new jobs are to be created, the reduction would therefore affect 386 jobs at the Bordes (Pyrenees-Atlantiques), Tarnos (Landes) and Mezieres-sur-Seine sites, which employ a total of 3,800. A natural reduction of 142 jobs could be achieved by the end of 1995, as part of a progressive retirement program. As for the remaining 308 jobs, the management proposes to step up the retirement rate, promote voluntary retirement in connection with transfers within the Labinal group, and encourage employees to volunteer for part-time work. If the personnel were to accept the possibilities offered, the 450-job reduction could be achieved without layoffs.

Three unions—CFDT [French Democratic Confederation of Labor], FO [Workers Force] and CGC [General Confederation of Managerial Personnel]—expressed their opposition to any plain layoffs or forced transfers within the group, while declaring themselves "ready to take part in the implementation of measures likely to provide solutions to the current overcapacity, based on voluntary decisions." The CGT [General Confederation of Labor] stated that the proposed personnel-reduction program was unacceptable.

Germany: AEG Readdresses Company Strategies

M11706151194 Bonn DIE WELT in German 20 May 94 p 14

[Text] "Our objective is to acquire a leading position in key strategic sectors on the markets for rail systems, microelectronics, automation systems, energy engineering and diesel engines," AEG Board Chairman Ernst Georg Stoeckl told the shareholders' meeting in Berlin yesterday.

Under the new name "AEG Daimler-Benz Industrie," the group is determined to become a technology group of the future. According to Stoeckl, the company intends "to contribute rail products and systems to the Daimler-Benz technology group's main transport technology business

and to ensure that all the companies of the group have access to strategically important microelectronics technology." The former household appliances and lighting divisions and stand-alone units such as lamps and meters, were being hived off, whilst LTU [Air Transportation Company] in Ludwigshafen was being acquired from DASA [German Aerospace Airbus]. However, the transition to the new business structure and the deep recession in the electrical industry have caused a serious drop in earnings in 1993: Overall, the group profit is down by 1.19 billion German marks [DM]. At DM11 billion, sales in 1993 were DM300 million below the previous year. New orders reached DM12.1 billion, 2 percent more than the previous year. However, this growth came only from exports—with foreign demand rising by 16 percent to DM5.3 billion.

In the first four months of the new year, AEG's new orders increased by 26 percent over the same period last year to DM3.5 billion. At DM2.4 billion, sales were 10 percent above the same period last year, up 56 percent in rail systems alone and 21 percent in microelectronics. After the parent company had cut dividends from DM13 to DM8 per share, it was proposed that AEG reduce its dividend from DM2.70 to DM1.65.

Eastern German Aerospace Company Successes Reported

*AU0406142894 Berlin NEUE ZEIT in German
30 May 94 p 12*

[Report by Reimund Westmeier: "European Partners in Aerospace Technology"]

[Text] The Thuringian Jena-Optronik GmbH, which is now in the third year of its existence, has expanded its business activities and is currently working on a contract from ESA, the European space agency. The company has 100 employees (90 percent of whom were space technology specialists in the former Zeiss combine) and is owned by the Daimler-Benz Aerospace Holding AG, which holds a 51-percent stake, as well as by Jenoptik AG, which holds a 49-percent stake. With sales having risen from 8.3 million German marks [DM] in 1992 to DM12.3 million last year, Jena-Optronik has been able to close the past two commercial years without posting any losses. Sales are to double in 1994. That is what was said by Klaus Berndt, head of the company's space technology sales, at the ILA '94 fair in Berlin-Schoenefeld.

The company is concentrating on the development and production of optical and optical-electronic sensors for the aerospace sector. According to Berndt, company activities cover all areas connected with the development, construction, and installation of such appliances. Jena-Optronik is in a position to process data on distances and analyze them in accordance with customers' requirements. The range of the company's space projects covers observation of the earth, measurement sensors, products for micro-gravitational research, and capsule technology. In addition to the successful use of various instruments in the Mir space station, appliances for the ESA environmental satellite ENVISAT, the 1996 international Mars mission, and the Artemis communications satellite have been developed since 1989. According to Berndt, the company has carried out numerous studies and projects for DARA [German

Agency for Space Flight Affairs] and ESA. This means that Jena-Optronik has succeeded in becoming integrated into the European and international space flight communities.

Over the next few years, the company will extend its activities to other areas. According to Berndt, the company is looking at "earth-based" industrial markets.

Eastern German Enterprises Catch Up To Western Counterparts Through Modernization

*94WS0335D Frankfurt/Main FRANKFURTER
ZEITUNG/BLICK DURCH DIE WIRTSCHAFT
in German 22 Apr 94 p 8*

[Text] Frankfurt. The GDR's disadvantage in the utilization of computer-assisted means of production has almost vanished by now. Eastern German companies have thoroughly modernized their production facilities. In comparison with western German businesses, eastern German businesses now use a computer-assisted production which is applied very broadly and using state-of-the-art technology.

But this forced technological modernization has meant that the correspondence between processing innovations and new product structures, in many cases still open, has often had to remain unsatisfactory. This is the conclusion reached by a joint investigation by the Fraunhofer Institute for Systems Technology and Innovation Research in Karlsruhe and the Institute for Social Science Research in Munich, based on a representative survey of 788 companies.

However, the report also states that the majority of the eastern German capital goods producers who remained in the market are still not economically secure yet. Although product innovations and client-specific production have gained in importance, it is said that the change in the spectrum of products is still not complete.

Because of the loss of the "internal GDR" marketplace (advance orders from eastern Germany have fallen from 91 to 43 percent) and of as yet untapped world markets, the report states that eastern German businesses have had to resort to job orders for production, which now make up more than a quarter of the volume of production.

In the search for more efficient production processes, the eastern German businesses regard investment in production plants as essential. Organizational measures are also said to be considered to be necessary but are thought to be of secondary importance. Most companies want to reduce the division of labor and far-reaching specialization, but the report says that it remains an open question how far alternative rationalization schemes are being consciously pursued. It is said that the potential for development still exists with regard to technology, organization and personnel.

EU: Automobile Manufacturers Establish Joint Research Association

94P60264A Paris LE MONDE in French 1 Jun 94 p 21

[Unattributed article: "European Automobile Manufacturers Wish to Increase Research Cooperation"]

[Text] On 27 May, in Turin, Jacques Calvet the enfant terrible, the CEO of PSA Peugeot-Citroen, arrived at a meeting of the European Automobile Manufacturers Association (ACEA). During the event, the automobile manufacturers of the old continent have set up an association named EUCARD (European Council for Automotive Research and Development) for promoting the need to conduct common research programs and for improving the presentation of their views in Brussels. They have agreed on a ECU1.8-billion- (close to 12 billion French francs) common research program, which they wish to be financed 40 percent by the Commission within the Fourth Common Framework for Research and Development that has been given a global budget of ECU11 billion for four years.

The new association should be the European response to the American USCar organization, which brought together Detroit's three large automobile manufacturers, and which the Government will subsidize to the tune of one billion dollars (six billion French francs).

This is not the first European attempt of this nature. As early as in 1991 such a common program, named the "Environmentally Friendly Vehicle," had been proposed around criteria approximately the same as the ones advocated henceforth by EUCARD, to develop clean, improved security and fuel consumption vehicles, better production methods and traffic flow. The program has been given a ECU1.2 billion budget.

EAST-WEST RELATIONS

Ukrainian Plant Signs Technology Contracts With France's Aerospatiale

AU1006153294 Kiev HOLOS UKRAYINY in Ukrainian
8 Jun 94 p 1

[Unattributed report: "The French Show Interest in 'Pivdenmash'"]

[Text] Several contracts have been signed by the "'Southern' Machine Building Plant" and design center "Pivdenne" [Southern] with the French corporation Aerospatiale-5.

The total cost of the contracts is estimated at 600 thousand French francs.

It is possible that, in the future, a contract will also be signed on selling to the French corporation of the technology for metal welding using the explosion method [metod vybukhu].

EUROPE-ASIA RELATIONS

France: CNRS To Set Up Joint Microsystems Lab With Japan

BR1306103694 Paris AFP SCIENCES in French
11 May 94 p 1

[Unattributed article: "Opening of First CNRS Laboratory in Japan Imminent"]

[Text] The CNRS [National Center for Scientific Research] is soon to open its first laboratory in Japan, on

the premises of Tokyo University, under an agreement signed on 10 May by Director General Francois Kourilsky and Mr. Hiroyuki Yoshikawa, the university chairman.

This laboratory, established for a minimum of three years, will be devoted to micromechatronics and microsystems, including all the submillimetric technologies of constructing and operating motors and robots less than a hair's breadth in diameter. The laboratory, to be known as LIMMS (Laboratory for Integrated MicroMechatronic Systems), will be the Japan-based antenna for three laboratories of the CNRS's Department of Engineering Science: the Laboratory for Systems Analysis and Architecture (LAAS), Toulouse; the Northern Institute for Electronics and Microelectronics (IEMN), Lille; and the Franche-Comte Institute for Microtechnologies (IMFC).

Six CNRS researchers should have relocated to Japan before the end of the year, with six post-doctoral French researchers joining them in 1995; they will use the equipment and facilities of Tokyo University's Institute of Industrial Science in the areas concerned. The CNRS has earmarked a budget of 2 million French francs to cover salaries and operation expenses for the French part of the laboratory.

"The establishment of the LIMMS meets the need to restore the balance in Franco-Japanese relations while ensuring coherence of approach between the CNRS's scientific strategies and the government," Francois Kourilsky said. Franco-Japanese cooperation will therefore develop not only in the field of engineering science, covered by LIMMS, but also in life sciences, human sciences, and environmental science.

"Though 400 French researchers visit Japan each year, few stay long, owing to the problems of language, integration, and isolation; in contrast, we receive seven times as many Japanese researchers in our country. The establishment of LIMMS should help to recreate some sort of balance," Kourilsky pointed out.

According to the CNRS Director General, "the intergovernmental agreements negotiated since 1992 on intellectual and industrial property have provided all the guarantees concerning the exploitation of the patents or technologies which will be developed by LIMMS' French and Japanese researchers. Though our laboratories are very strong in basic research in these areas, and as a result are highly respected in Japan, we are very interested in acquiring Japanese know-how."

Jean-Jacques Gagnepain, CNRS's director of Engineering Science, stated that "research into microsystems began to develop four or five years ago in the United States, and then in Japan, Switzerland, the Netherlands, and France. Microtechnologies are undergoing considerable development, not only in fields involving operations on the human body, but also in order to avoid humans having to dismantle tools under extreme conditions, such as nuclear power."

To facilitate the establishment of LIMMS, the CNRS has set up a five-month training program in Japanese language and culture, and its researchers will also benefit from the existence of the CNRS's permanent office, opened last

year. "We preferred to work with publicly-funded laboratories such as those of Tokyo University," Kourilsky explained. "The capital was chosen because of the availability of the Tokyo French School for our employees' children."

Germany, Japan To Intensify Space Cooperation

BR1706143494 Bonn DIE WELT in German
16 May 94 p 23

[Text] At the second meeting of the German and Japanese space agencies DARA and NASDA in Tokyo, an agreement was reached for extensive cooperation at both the technological and political levels. After his talks in Tokyo, German space agency Managing Director Jan Baldem Mennicken stressed the impressive consistency with which Japan pursued its space policy. Whilst the 1994-95 Japanese draft budget provides for a mere two-percent increase in expenditure, spending on aerospace engineering is projected to rise by a clearly disproportionate seven percent. The goal of the Japanese program is to benefit from Earth remote observation (resources exploration, weather and disaster forecasting), telecommunications, and research under space conditions, which is seen as extraordinarily promising. Japan is currently redefining its long term aerospace program, but it has already been made clear in Tokyo that Japan is thinking of tapping natural resources on the moon and Mars.

However, the Japanese-developed H-II launcher system will not compete with the European Ariane in the future. But the German side stresses that with this launcher system Japan has opted for a technologically highly ambitious and very powerful solution, making the country an attractive collaborator. At the same time, the Japanese side has now also expressed the desire to intensify cooperation with Germany by having a contact in Tokyo, too, and by a mutual exchange of personnel. To this end, NASDA has already opened an office in Bonn, aside from their office in Paris.

In addition to joint projects in the sectors of zero-gravity, Earth observation, and development of instruments in particular, cooperative projects in materials and combustion research as well as standards and norms have been agreed upon in Tokyo, Mennicken added.

An agreement has now also been reached for even closer coordination in talks with the United States on cost management and financing of a space station project, scheduled to start in 1997. In the framework of its national space policy, Japan is very keen that see this project, in which Canada and Russia also participate, realized as planned.

On the other hand, rather than merely paying the United States for the use of their space shuttle, the Europeans are trying to assist their aerospace industry by making a material contribution (use of the Ariane system to carry payloads and later also to bring back crew members), Mennicken continued.

NEC, Bull Cooperate on Large Computer Systems

94WS0364A Frankfurt/Main FRANKFURTER
ZEITUNG/BLICK DURCH DIE WIRTSCHAFT
in German 17 May 94 p 8

[Text] Tokyo. The Japanese electronics manufacturer NEC and the French computer producer Bull Group want to put a jointly developed large computer or mainframe on the market within two years. Details of this project have not yet been specified, but it is expected that bipolar transistor techniques will be used with which high data processing speeds could be reached. Experts in the field also believe that NEC and Bull will at a later date develop large parallel processing computers with less expensive metal-oxide semiconductors.

NEC and Bull are among the pioneers in the area of international cooperation. Both companies have already been working together successfully for twenty years in marketing, technology and financial matters. The NEC/Bull alliance began in 1973 with a semiconductor agreement. Now for the first time, both companies intend to work together on the development of a new product.

However, other electronics companies are also looking for international cooperation. Just recently Fujitsu Ltd., Japan's largest computer manufacturer, and Hitachi Ltd. joined with American partners. Although the honeymoon for large computers is clearly over and many companies see the future in small, high-performance computers, large computers will retain their advantage when it comes to the management of large amounts of data.

Since there continues to be a demand for higher speeds and greater handling capacity, the manufacturers find themselves facing considerable development costs with the large computers, which by their own assessment they can no longer bear alone. More than ten billion yen would have to be spent in the development of a new large computer. The development risks are also too great for individual producers.

At 835.5 billion yen (about 13.5 billion German marks), last year's production of large computers in Japan was off by 22 percent compared to the previous year. Japanese market observers expect that the market volume in large computers will shrink by half in the next five years.

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